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RATIONALE OF THE THERAPEUTIC ACTION OF ARSENIC IN DISEASES OF THE SKIN.

There is perhaps no remedy in the entire range of the *Materia Medica* that can be relied upon with greater certainty to produce its legitimate results in a given time than arsenic.

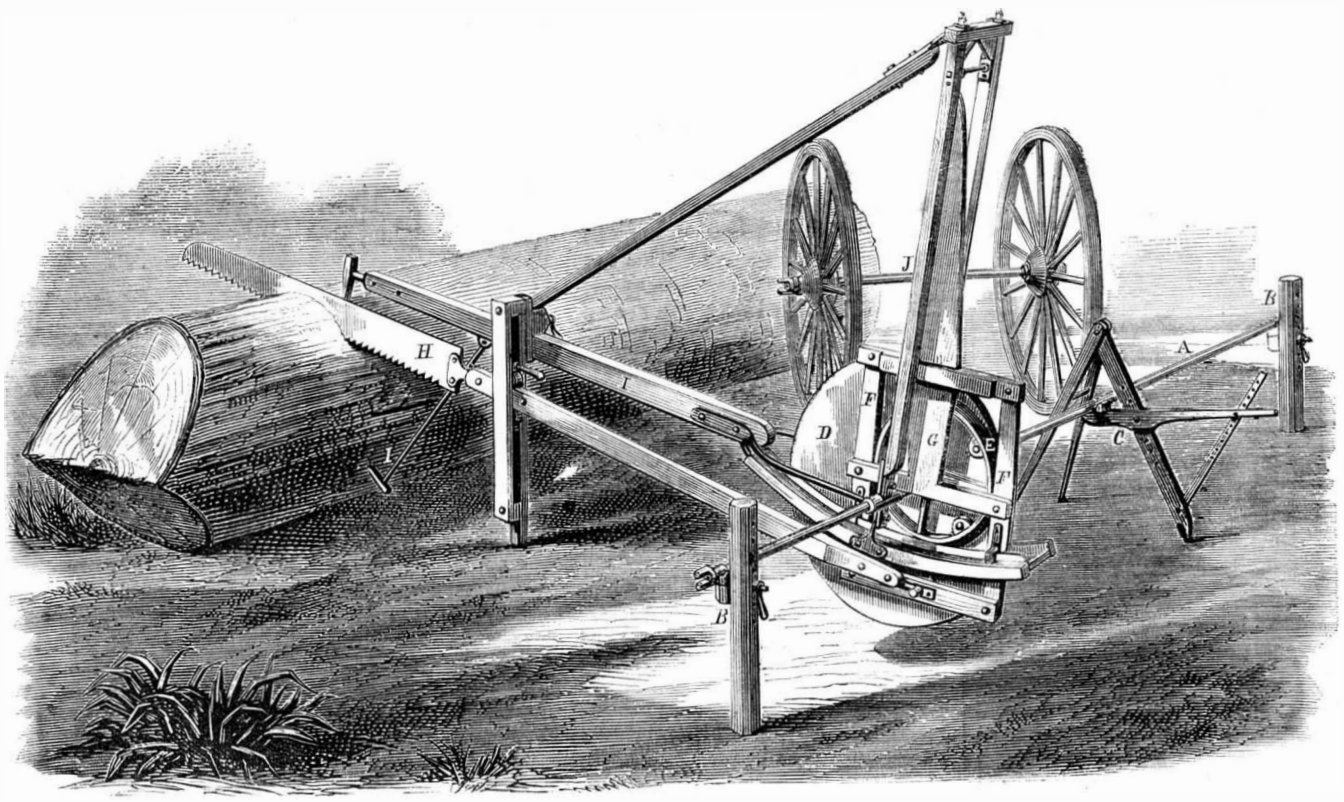
It is generally indicated in diseases of the skin, Eczema being one of the most common of these troublesome affections. It is usually exhibited in the form of K O, As O_3, in solution called in the pharmacopœias, Fowler's Solution, and its effect is so marked and so obviously tracable to itself, as often to create wonder even in the minds of those accustomed to witness its action upon the human system.

The diseases for which it is administered are situated upon the surface, and have long been suspected, and more recently, by microscopic examination, many of them have been determined to be parasitic in their character. Such being the case, the manner in which arsenic taken into the stomach effects a cure, becomes an interesting subject of inquiry; and as we have never met with an explanation of the phenomenon, we venture to suggest that the following may be the rationale of its action.

Arsenic, and its oxides, arsenious acid, As O_3, arsenic acid, As O_5, and its salts are all highly poisonous. When taken into the stomach they are not assimilated, but are absorbed and distributed through the entire system. When taken in extremely small doses, no inconvenience is felt by the patient; it is eliminated as fast as it is supplied. But if the dose be increased, poisonous effects will be produced, because the system cannot clear itself of the noxious matter with sufficient rapidity. The eyelids present a puffed appearance, which is an indication that the remedy has accumulated, and that its further administration would inconvenience and endanger the patient. Now at this stage the poison is equally distributed, in a state of extreme subdivision, and its elimination takes place largely through the pores of the skin, each of which is a nidus for a parasitic growth, and here becoming mixed with the pabulum which nourishes the parasite, it, by actual poisoning, destroys the cause of the mischief.

Improvement in Portable Reciprocating Sawing Machines.

When timber is felled it must be cut into convenient lengths for transportation, unless the trunk of the tree is intended for spars or long lumber; but especially where it is intended to use it for shingle or stave bolts, or for fuel it is evident that much time and labor will be saved in the cutting up of the logs *in situ*. This is the object of the machine herewith illustrated. It is a simple frame supporting the driving apparatus for a saw, and capable of being moved from place to place as occasion may demand. A long shaft, A, is supported near its ends by stakes, B, driven into the ground, having adjustable boxes for the purpose of properly leveling it and being further sustained and prevented from springing by movable supports, C, also adjustable, constructed in a manner similar to the carriage jacks in common use. On this shaft is a balance wheel, D, and an eccentric, E, the latter of which plays between two parallel upright bars, F, secured to a swinging bar, G, and by this device the saw, H, is driven by means of a pitman attached to the lower part of the swinging bar, G. Suitable dogs, I, hold the log while being sawed, and a guide and support driven into the ground near the log control the movements of the saw. In this guide is a box with rollers for the pitman, the box having a handle by which it and the saw can be raised.



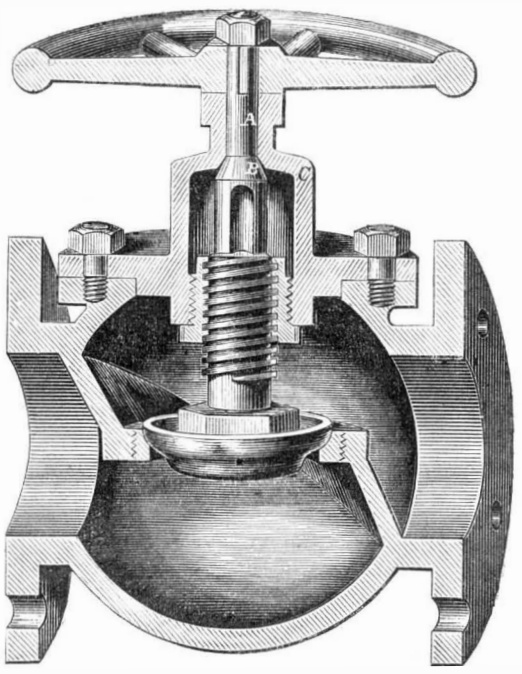
BELL'S PATENT PORTABLE SAWING MACHINE.

The shaft, A, is slotted nearly its whole length and the wheel and eccentric, D and E, have a feather in their hubs to engage with it. By this arrangement a log of many feet in length may be sawed into a number of bolts without disturbing the supports of the shaft. A pair of wheels, J, on a shaft of the same diameter as A and similarly slotted, is used to transport the machine from place to place, and also when slightly sunk in the ground they serve as supports to the machine while in operation. The power, of any sort, is attached to the end of the shaft by a clutch or any other suitable means.

Patented through the Scientific American Patent Agency Feb. 4, 1868, by G. W. Bell, who may be addressed for further information at Rising Sun, Ind.

PATENT SELF-PACKING STEAM VALVE.

Not among the least of the annoyances attending the operation of ordinary gates or globe valves is the necessity of



occasional and sometimes frequent packing of the stem. Efforts have been made to construct a valve that should be self packing and be always, under all circumstances, tight. This valve seems to be perfect in this respect. Externally it is like the ordinary valve, but internally very different. The revolving stem, A, has formed on it a valve, B, the seat of which is in the under side of the bonnet, C. The lower part of this stem is slotted, forming a key which fits loosely in a corresponding recess in the screw stem, which is of usual form. Thus the two are not rigidly connected, but one is allowed to act, in a measure, independent of the other.

The result is that while the revolving stem will readily, as in the ordinary valve, turn the screw, it will not prevent the valve of the latter from finding its seat. As this portion moves freely on the revolving screw it is evident the valve of the former will always prevent the escape of steam or water. There can be no transverse strain upon the stem under any circumstances. The valve is manufactured by Morris, Tasker & Co., 209 South Third street, Philadelphia, Pa., under patents issued to Sargent & Towne, June, 1865, and John C. Schaefer, Feb., 1866. All orders and letters relating to this invention should be addressed to Morris, Tasker & Co., as above.

Influence of Anæsthetics on Brain and Nervous System.

Dr. Richardson's fifth lecture, was a study of the influence exerted by anæsthetics on the brain and nervous system. The obvious fact that the motion of the heart and the movements of respiration continue in action while the rest of the body is under the narcotic effect, during anæsthesia, proves that the whole nervous system is not involved, and that the involuntary and semi-voluntary muscular mechanism is also not involved except when extreme and fatal symptoms are developed. What parts, then, are influenced by an anæsthetic? The idea was almost intuitive that the brain was the organ affected, and that the centers of consciousness are those chiefly held in abeyance. But, to prove this as true, experiment was necessary. In proof, the lecturer took a large pigeon, narcotized it deeply with chloroform, and in this state passed through its body, from the head to the foot, a rapid intermittent induction current. The bird instantly rose from the table, extended its wings, opened its eyes, and seemed as if restored; the current was then stopped, and the bird was shown to be as deeply asleep and as powerless as before. Another bird was put to sleep by freezing the brain, and when utterly insensible was subjected to the electrical shock in the same way, when it flew from the table into the room, where, breaking its connection with the battery, it dropped on the floor comatose, motionless, and as anæsthetized as before, in which condition it remained for many minutes. The lecturer in these experiments demonstrated that the anæsthetic action was localized in the cerebrum. His battery was like an outer brain, which supplied power without intelligence, and which, by the effects of its current, showed that all the muscular elements were ready for work, and only awaited the order from the brain. The lecturer next discussed the question—What, during the process of anæsthesia, leads to this change in the brain? Is there a chemical action on albumen? Is there pressure on brain matter? Is there deficient oxidation of the blood? Is there contraction of blood vessels, and diminished supply of blood from that cause? All these hypotheses were experimentally tested and negatived. It was admitted that during extreme anæsthesia there is reduced oxidation and a singular reduction of temperature. These changes are inevitable, because the anæsthetic vapors replace oxygen during their diffusion into blood; but the diminished oxidation is not the cause of the insensibility. In proof of this Dr. Richardson showed an animal breathing an air in which the oxygen was reduced by addition of nitrogen from 21 parts to 9 parts in the 100, side by side with another similar animal breathing an air in which the oxygen was reduced by the addition of vapor of bichloride of methylene only to about twenty parts in the 100, viz., four cubic inches in 500. The result was that the animal in the extremely reduced atmosphere was quite unaffected, while the animal in the slightly reduced atmosphere was in the deepest narcotism. Then a correcting experimental test was adopted, and the bichloride was administered in an atmosphere containing an excess of oxygen, the oxygen being present in double its ordinary or natural proportion; the excess of oxygen exerted no perceptible obstacle to the anæsthesia.

To determine whether there was contraction of blood vessels under anæsthetics, the lecturer had had recourse to transparent small trout; through their bodies, with the microscope and the inch lens, the bloodvessels could be seen, and the corpuscles flowing through them. These animals can be narcotized readily by making them breathe water saturated with

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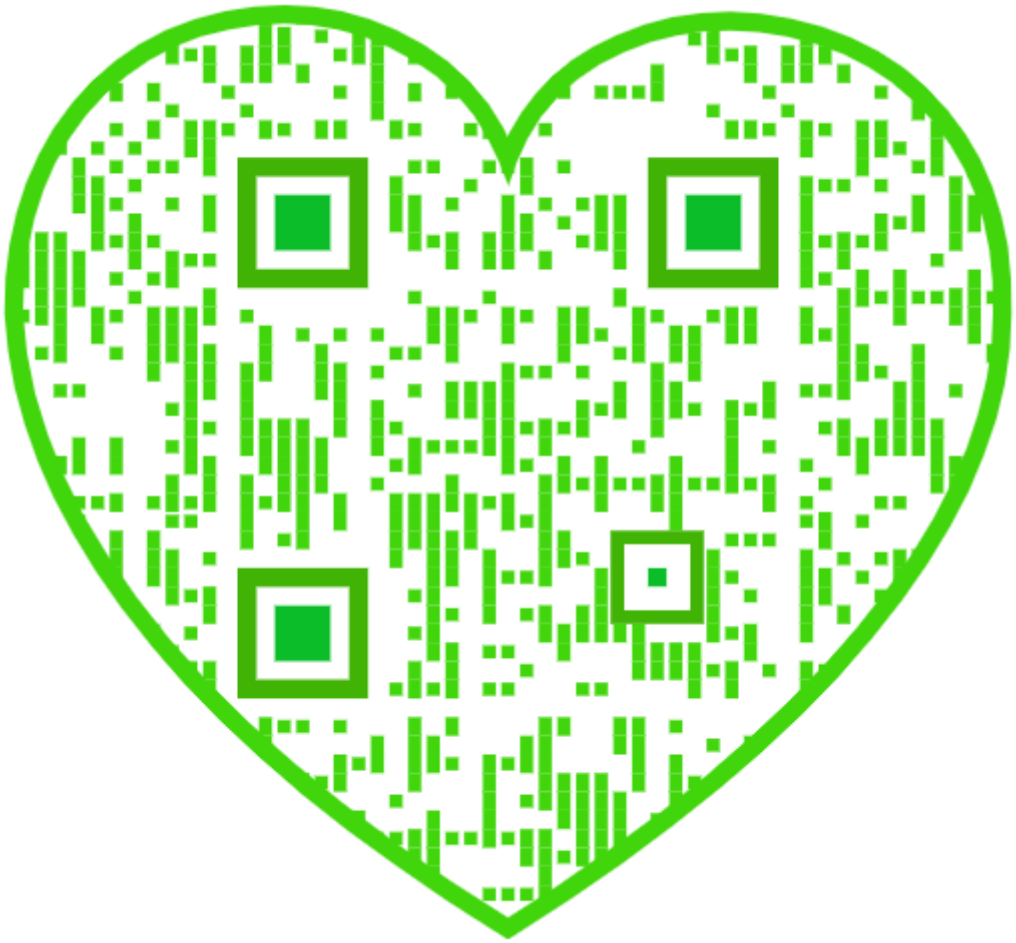

chloride of methylene or ether. In the narcotized condition, the vessels do not contract, but under the influence of ether, in the later stages, before death occurs, dilation and regurgitation are observed. The latter is noticed also when chloride of methylene is used. With both reagents breathing and vessel circulation cease before the heart's action. The lecturer concluded that anæsthetic vapors act directly upon nerve matter either by preventing the developement of force or by stopping conduction. The latter hypothesis is supported by the fact, proved by experiment, that these vapors obstruct the conduction of heat and electricity.—*Med. Times and Gaz.*

ALLOYS--REVIEW OF A LECTURE BY DR. A. MATTHIESEN, F. R. S.

Up to a very recent period the knowledge of alloys was confined to the physical characters of a very few of the possible combinations of different metals, and the chief contributions to the general stock of information in relation to the subject were the result of unsystematic and desultory experiment. Nothing like generalization was reached, and it was impossible, from the knowledge of the properties of an alloy containing definite proportions of two or more elements, to predict, even approximately, the properties of a combination of the same elements in varied proportions. The great importance of the subject, has, however, stimulated investigation, until at last something definite has been reached; and although as yet the smallest possible portion of the field has been worked over, an approach has been made to the proper method of working, and as a consequence we shall no doubt witness results equal in importance to other modern chemical discoveries which have created new branches of art and manufacture and revolutionized many of the old.

The researches of Dr. Matthiesen, the results of which he submitted to the Royal Society, in a lecture delivered at the Royal Institution, on the evening of March 20, are of great interest. The lecture was illustrated by many beautiful and ingenious experiments, and undoubtedly ranks among the most valuable recent contributions to science.

Dr. Matthiesen's definition of the term alloy is, *a solidified solution of one metal in another*. By solidified solution is meant a solution of substances which have become solid, *e.g.*, glass obtained by fusing together different silicates, and allowing the homogeneous liquid to solidify. The most important characteristic of a solidified solution is its homogeneousness. The most powerful microscope should not reveal its components.

As an illustration of the difference between chemical combination and the solution of metal in metal, the lecturer plunged a rod of gold and another of copper into separate portions of molten tin. The gold dissolved rapidly in the tin, but the copper rod, though previously tinned to insure perfect contact between the two metals, remained undissolved. To properly appreciate this experiment it should be borne in mind that the fusing points of gold and copper are nearly the same (gold 2,016° F., copper 1,990° F.), and much higher than the fusing point of tin, which is 442° F.

This experiment was followed by others equally instructive and interesting, calculated to show the solvent power of fused substances.

Dr. Matthiesen proceeded to classify the phenomena attending the solution of metals in metals, as follows:

I. The solid metal dissolves quickly in the melted one with evolution of heat. Examples: gold in tin just melted; sodium in mercury.

II. The solid metal dissolves quickly without evolution of heat. Example: lead in tin just melted.

III. The solid metal dissolves slowly. Example: copper in tin just melted.

IV. Only a partial alloy is formed, or in other words, each metal dissolves to only a limited extent in the other. Examples: lead and zinc, lead dissolving only 1·6 per cent zinc, and zinc only 1·2 per cent lead; bismuth and zinc, bismuth dissolving only 8·14 per cent zinc, and zinc only 2·4 per cent bismuth.

He also divided metals considered as components of alloys into two classes:

Class A.—Those metals which impart to their alloys certain physical properties (such as conducting power for electricity) in the proportion in which they themselves exist in the alloys. The metals belonging to this class are lead, tin, zinc, and cadmium.

Class B.—Those metals which do not impart to their alloys such physical properties in the proportion in which they themselves exist in the alloys. All the metals, except the four named as belonging to class A, probably come under this head.

He further separated alloys into three groups:

a. Those made of the metals belonging to class A with one another.

b. Those made of the metals belonging to class A with those of class B.

c. Those made of the metals belonging to class B with one another.

The Doctor showed by a series of conclusive and remarkably ingenious experiments that in alloys specific gravity, specific heat, and expansion due to heat, are in all cases approximately equivalent to those possessed by the component metals; and that fusibility and some other properties are never equivalent.

Another class of physical properties are those which in some cases are, and in others are not, imparted to alloys in the ratio in which they are possessed by the component metals. This class of properties includes conducting power for heat and electricity, sonorousness, elasticity, and tenacity. The separation of metals into two classes (A and B) is founded on a consideration of the latter class of properties.

Alloys made of the metals belonging to class A only (lead, tin, zinc, and cadmium) conduct electricity in the ratio of the relative volumes of the component metals. The conducting powers of a series of such alloys, say those of tin with zinc, may therefore be represented graphically by straight lines.

In alloys made of the metals belonging to class A with those of class B, the conducting power of the B metal undergoes a marked change, while that of the A metal remains unaltered. The conducting powers of a series of such alloys, say those of copper with tin, is represented graphically by a bent line approximating to the form of the letter L. There is a rapid decrement on the side beginning with the metal belonging to class B (copper in the case referred to) until a certain point is reached, when the line turns and goes straight to the metal belonging to class A (tin in the case cited).

In alloys made of the metals belonging to class B only, the conducting power of each component undergoes a marked change, hence such alloys do not conduct electricity or heat in the ratio of the relative volumes of their component metals. The curve which represents graphically the conducting powers of a series of such alloys, say those of silver with gold, has approximately the form of the letter U. There is a rapid decrement on each side of the curve, and the turning points are connected by a line nearly straight.

The turning points of the curves representing the conducting powers of series of alloys of the second and third groups, necessarily correspond to certain alloys in which the alteration of the physical properties of the components is most strikingly exemplified. It is a fact of no small importance, therefore, that these turning points represent approximately the composition of some of the most valuable alloys which are employed for technical purposes. Thus, gun metal, containing 10 per cent tin, is marked on the copper-tin curve, the turning point of which corresponds to 12·5 per cent tin. Brass, containing 28 per cent zinc, is marked on the copper-zinc curve, the turning point of which corresponds to 25 per cent zinc. Twenty-two carat gold, alloyed with silver, is marked on the silver-gold curve, close to one of its turning points, and the same alloyed with copper, on a corresponding portion of the copper-gold curve. Again, a silver-platinum alloy, containing 33 per cent of platinum, employed by the electrical standard committee for their unit-coil, and largely used by dentists for making springs for artificial teeth, is the alloy which forms the turning point of the silver-platinum curve.

Further experiments demonstrated the fact that alloys of class B with those of class A give a great increase of sonorousness.

The following experiments were made to test the tenacity of metals and alloys with the annexed results. The tension was made by the use of a winch, and measured by a spring balance. The wires used were double, gage No. 23:

	Breaking strain for double wire.
Tin	under 7 lbs.
Lead	" 7 lbs.
Gold	about 25 lbs.
Copper	" 30 lbs.
Silver	" 50 lbs.
Platinum	" 50 lbs.
Iron	" 90 lbs.
Tin-lead alloy	under 7 lbs.
Tin-copper alloy (12 per cent copper)	about 7 lbs.
Copper-tin alloy (12 per cent tin)	" 90 lbs.
Gold-copper alloy	" 75 lbs.
Silver-platinum alloy	" 80 lbs.
Steel	above 200 lbs.

These results show that the tenacity of metals belonging to class B is greatly increased by alloying them with metals of the same class. By experiments with spirals of hard drawn wire of the same gage it was shown that elasticity follows the same law as tenacity.

The practical conclusion drawn from the facts illustrated by these experiments was, that when a new alloy is desired which shall posses some special physical property, an examination should first be made of the alloy indicated by the turning point of the curve which represents the conducting power of the two metals.

We consider these conclusions to be of the greatest importance, and venture to predict that through their application during the next decade many valuable discoveries will be made, and a new impulse given to the art of metallurgy.

THE WATCH--ITS HISTORY AND MANUFACTURE.

BY H. F. PIAGET.

No. 3.

THE SELECTION OF WATCHES.

Were it possible to give rules for the selection of watches, society might be benefited, as the young man who has a bad watch is less likely to obtain habits of punctuality than he who has a good one. I once heard an anecdote of two young persons who were allowed to select watches for themselves. One chose a plain watch, from being told that its performance could be depended upon. The other, attracted by the elegance of the case, decided upon one of inferior construction. The possessor of the good watch became remarkable for punctuality, while the other, although always in a hurry, was never in time, and discovered, as a celebrated writer justly observes, "that next to being too late, there is nothing worse than being too early." Unfortunately, no efficient instruction can be given, as none but a workman possessing the highest knowledge of his art is capable of forming a correct opinion, and a watch must be bad indeed for an inexperienced eye to detect the defects, either in its principle or its construction. Even a trial of a year or two is no proof, for wear seldom takes place within that time; and while a good watch, if in order, can but go well, a bad one may by chance occasionally do so.

I have myself seen some of the old rack lever watches that were more than fifty years old, and worn constantly, nearly as good as new, by having been properly attended to, and in time. It is not sufficient that a watch be well constructed, and on good principles. The brass must be hard, and the steel properly tempered. The several parts must be in exact proportion, and well finished, so as to continue in motion, with the least possible friction. It must also be made so that when taken to pieces all its parts may be replaced as firmly as before.

A watch thus constructed and properly adjusted will continue its motion and correct performance for years without trouble, and with little expense, except occasionally cleaning. A bad watch is one to which no more attention has been paid to the proportions of the parts or durability of materials than was necessary to make it perform for a time. It is either the production of inefficient workmen, or of those who, being limited in price, are unable to give sufficient time to perfect their work. There is a great fault in many watches and movements, sent both from England and Switzerland—they are not properly examined, adjusted, and regulated, before exported.

Formerly, and it is still the case in many instances, the most eminent watchmakers were all practical workmen. At present, there are but few manufacturers who work themselves, and if they do, have not time to see to every watch sent away. Those who value the reputation of their watches have a practical workman, one who understands thoroughly every branch of the business, who is called the examiner, whose duty it is to take every part and see that it is properly made, adjusted, and put together on correct principles; for where a piece of mechanism like a watch is made in so many parts or pieces, it is next to impossible but some slight oversight or imperfection may occasionally occur. The examiner or manufacturer then regulates every watch or movement (if correct) before being sold.

But latterly, the competition for cheapness has been so great that in many cases the examiner is dispensed with, as good examiners are paid very high wages—it being necessary for him to have considerable skill and experience before being entrusted with such an important position. Also, many watch manufacturers have not the opportunity of examining every watch, in order to fulfill their orders in time at the busy season, and many watches, particularly cheap ones, are merely *going machines*, and not time-keepers.

Another fault with many watches sent from Europe to this country, is that the oil has not been changed; the oil mostly used in the manufactories will not do in this climate, and but few watches will perform correctly until the oil is changed. Still, another fault, and one which often brings discredit on a good maker, particularly in cheap work, is that when the watch or the movements are cased in this country, the movements go in the hands of workmen, who merely take them down for casing, or are paid so little for the work that they cannot properly examine them, and correct any oversight or imperfections in manufacturing, and frequently have to do the work in great haste; if the balances only vibrate with a good motion, it is all that is wanted of them. Bad watches in some instances, with strong springs, will go well for a time, but as they wear from friction, they require frequent repairs, which cannot effectually be done, for in correcting one defect in a badly constructed watch, you frequently find several others, which could not be discovered before.

The principal cause of imperfect watches is the universal desire of obtaining them for as little money as possible, and to reduce the work of watchmaking to the same value, is to compel good workmen to produce bad work.

When an art is difficult to learn, requiring much knowledge and study, with years of experience, the number of really good workmen will be few, and therefore employed by those who can offer the best remuneration. Few can judge of a machine, the accuracy of which depends upon the most minute correctness of principle and execution; it is not wonderful, therefore, that there are numbers of bad watches, since a portion of the public considering them as mere ornaments, or in many instances only bought to trade, and not for use as time keepers, procure them from dealers who, however just and honest they may be, can never possess that knowledge which is only acquired by long practice in that particular art, and may therefore be themselves deceived. Those, also, who in order to meet the general desire for cheapness sell at low prices, can only do so by producing inferior watches, for a greater division of labor, or use of machinery, can scarcely be brought into operation. The workmen are therefore compelled to do the greatest quantity of work in the least possible time, and good work in watches must not be slighted. It is often supposed that the principle on which a watch is constructed must determine its quality. This is far from being the case. A duplex watch may be very bad if not well made and the escapement in its true principle. A chronometer watch with the same fault is still worse, while a common vertical watch may be good if well made. I have seen good vertical watches which had been in constant use for upwards of fifty years, with new verges put in occasionally, and kept reglarly cleaned, which were still much better than many of the full jeweled levers made at the present time. To make one watch better than another, execution must be added to principle.

It may be here mentioned, that undue importance is frequently attached to watch jeweling; many low priced and bad watches have eight or ten holes jeweled, while many that are good have but four. To state the number of holes which ought to be jeweled, would require details ill suited to a work which is merely elementary. But when it is known that in common watches the holes can be jeweled in Europe at less than fifty cents each, it will be seen that the number of holes jeweled affords no criterion by which to estimate the value of a watch. But in fine watches, which are jeweled with rubies

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and are highly polished, the cost is four times more. Therefore the judgment of the seller may be fairly questioned, should he attach much importance to the number of holes jeweled. The high sounding description, the maker's name (unless it is genuine), the offered trial, the enticing cheapness, are often effective baits to the short-sighted.

It has already been shown that the principle of a watch is no proof of the excellence of its quality, the beauty of its case, etc., in no way effects its works, and even the offered trial is not a sufficient test. The purchase of a very cheap watch may teach the useful lesson, that low price is not exactly the word for cheapness. The size and form of a watch are determined by fashion or convenience, and although the appearance is of less consequence to a person buying one for his own use than the quality, yet no reason exists why a good watch should not be handsome, while many that are showy and handsome are good for nothing as time keepers, and are merely useful as articles of trade.

The individual who wishes to procure a good time-keeper should apply to a watchmaker or dealer of known honesty and ability in his art or business, and who therefore should be implicitly trusted. The various prices will point out the comparative qualities of the works, for the external ornament of a good watch form but a small portion of the expense. In regard to choosing either an English, an American or Swiss watch, circumstances must in many instances determine that. There are good makers in each country. If you have a preference for any particular maker, be sure to get one with the genuine name engraved on it. For a moderate thick watch, choose an English or American watch; for a thinner watch, or one of small size for a lady, take a Swiss one, as Swiss watches are to be preferred for small size, style, and lowness of price. With the exception of size, the appearance of a watch is totally independent of its quality as a machine—it may be handsome, yet bad. But a good watch is seldom unsightly, for the knowledge of form, indispensable to a good watchmaker, is doubtless the reason why watches made by good makers generally look well, although they have become antiquated. With regard to size, although there is no necessity for the large, thick watches worn some years ago, yet those very flat and small are deficient in the first principles required for correct performances and durability, and are more easily spoiled by unskillful workmen in repairing. Although all the parts may be in equally reduced proportion, the very particles of the metals, the more rapid decay of the small portion of oil which can be applied, and the limits to the visual power of man, must ever prevent a very small watch from being as serviceable as one of moderate size; that is, the smallest consistent with accuracy and durability. The large, thick, old style of watch is less absurd than some now made. Reason may justify the one, while fancy is the only apology for the other.

There are other circumstances which must also determine the choice. If the purchaser is going in parts of the country where he may not find skillful workmen in case of an accident or repairs, he should procure a watch constructed on a principle generally understood, and which can be easily arranged when out of order.

The preceding remarks are all that suggest themselves as useful to the inexperienced in selecting watches. More detailed instructions would explain the construction of the machine, and might be interesting to a few, in particular to watchmakers—there are works published for their use and instruction; but to be able to discover the quality or imperfections of a piece of mechanism so minute and complicated as a watch, requires knowledge and patience attainable only by a long experience. I will therefore explain the different kinds of watches made, and leave it to the purchaser to make his selection.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Do We See the Sun so soon as it Rises?—Aberration of Light.

MESSRS. EDITORS:—When there are books, as stated on page 277, in which it is laid down that "as it takes light eight minutes to come from the sun to the earth, we do not see the sun until eight minutes after it has risen," then such writers, in order to be consistent, must also state that as it takes light one second to reach us from the moon, we see her at the place she left only one second ago; and as it takes light three, ten, or a hundred years to come from different fixed stars to the earth, we now also see those different stars at the place they occupied three, ten, or one hundred years ago, which is perfectly absurd; this might perhaps be the case if the earth stood still and the stars revolved. As however the earth moves between the sun and fixed stars, which are comparatively at rest, leaving out refraction or other disturbing elements, we see the sun, not eight minutes after it has left the place where we see it, but we see the sun (not only at sunrise but always) twenty seconds of a degree in its apparent orbit ahead of the place it really occupies. This may appear paradoxical, but I will prove it to be the fact.

EFFECT OF ATMOSPHERIC REFRACTION.

It may be well to dispose here of refraction, notwithstanding it is left out of account, its knowledge is related to our subject. It amounts at sunrise and sunset to about half a degree, thus equal to the apparent diameters of our sun or moon. We see, therefore, those bodies when rising or setting so much higher than their true position, so that when they are exactly below our horizon, so that this is in line with their upper edge, we see them above our horizon, touching it with their lower edge, as the apparent motion of the sun amounts to 15° per hour, or 30′ in two minutes' time, its apparent place, when rising almost perpendicular, is, at sunrise, two minutes ahead, and at sunset as much behind his real position. In winter and at high latitudes where the sun rises and sets in an orbit not perpendicular but very oblique to the horizon, its displacement by refraction is not in its orbit, as it is always an apparent lifting up, vertical to the horizon.

DISCOVERY OF THE ABERRATION OF LIGHT.

The problem of the combined effects of the velocity of light and the earth's motion, has been solved by the astronomers of a former century, and is known as the theorem of the aberration of light. Its theoretical solution is in perfect accordance with the minutest practical observations, made with the most elaborate and largest astronomical instruments, which in some observatories of Europe have been constructed, chiefly for the special purpose of measuring the amount of this aberration. The history of this discovery, and of the gradual development of its theory is very interesting, but would occupy many pages of this paper and therefore must be passed by. I will only state that it means the apparent displacement of all heavenly bodies by the motion of the earth, that its amount is independent of their distances from us, that it is zero for those bodies, towards or from which the earth is moving in its yearly orbit, and at its maximum for those placed at right angles to the direction of this motion.

EXPLANATORY ILLUSTRATION OF ABERRATION.

To understand this combined effect of the earth's motion with the transmission of light, let us imagine rain-drops to fall down like they do in a perfect calm, perpendicular to the earth's surface. Let us now suppose we are standing on the platform car on a railroad track, and rapidly moving forward or backward; when moving forward the rain drops will strike the front part of the body, and will appear to arrive under an angle, deviating forward from the perpendicular and greater in proportion as the motion of the car becomes more rapid. When moving backward, the opposite will be the case, the rain-drops will strike from behind at an angle which also will deviate more from the perpendicular in proportion as we are moving faster. In both cases the rain will appear to us to arrive or come down from a direction inclined towards the side we are moving to, and not perpendicular as is really the case.

APPLICATION TO THE ABERRATION OF LIGHT.

Now this is exactly the case in regard to light coming from the heavenly bodies. When we compare the direction of the rain-drops with that of the light, and the motion of the earth in its yearly orbit with the moving railroad car; when the light comes to us at a right angle with the direction in which the earth is moving, it will cause an apparent change in the direction of the light, and consequently in the apparent place of the heavenly body the light is coming from. If the velocity of the earth's motion in its yearly orbit was much slower than it really is, so that it was to our instruments incomparable with the velocity of light, it would exert no influence on its apparent direction; but it happens to be so rapid that the relation is quite within the pale of actual measurement, as the following calculation will demonstrate.

SIMPLE CALCULATION OF THE AMOUNT OF ABERRATION OF LIGHT.

The earth moves in its yearly orbit with a velocity of nearly 70,000 miles an hour, the light is transmitted at the rate of 650 million miles an hour, which is 9300 times faster than the velocity of the earth. When now we take in consideration that an equal velocity of both would change the direction of the perpendicular or 90° into its half or 45°, we see that a velocity of only $\frac{1}{9300}$ will deviate the angle only to $\frac{1}{9300}$ of 45°, or 18 seconds; which, however, ought to be corrected trigonometrically, (for which we have here no space) to about 20 seconds. This now must be the maximum aberration produced by the yearly motion of the earth, on the position of all stars observed at right angles to the direction of that motion. They must all appear displaced to an amount of 20″ forward to the direction of the earth's motion, and this is the most easily observed in all those placed at about right angles to the ecliptic. As the earth moves in its yearly orbit around the sun in the opposite direction it did exactly six months before or after, the apparent displacement or aberration must for the same stars near the ecliptic pole be 20″ in one direction, and six months afterward 20″ to the opposite side of the heavens, making in all 40″ displacement in their positions; they therefore will yearly appear to move in small circles of $\frac{2}{3}$ of a minute in diameter.

ACCORDANCE OF THEORY WITH OBSERVATION.

This now is actually and exactly the case. It takes, of course, very perfect apparatus to observe seconds of degrees, but the more correct and minute the observations have been made, the more they correspond with this theory; for stars around the poles of the ecliptic it is proved fully 40″, for those toward the ecliptic less, and finally for those in the ecliptic, for the time that the earth is moving towards or from them, no aberration whatsoever can be observed.

INFLUENCE OF THE EARTH'S DAILY MOTION ON THE APPARENT PLACE OF THE SUN.

The velocity of the earth's equator by the daily rotary motion, is 1500 miles per hour (only that of a cannon ball), and being thus about fifty times smaller than that of the yearly velocity, would in the most favorable circumstances cause an aberration of less than half a second, which is almost imperceptible by the at present existing most correct instruments, therefore it may be left out of our calculations.

As the daily rotation of the earth cannot to any perceptible degree have any influence on the apparent position of the heavenly bodies, it can have no influence whatsoever on the apparent position of the sun, even at midday, and much less at sunrise or sunset, when this rotation turns us toward or from this luminary.

APPARENT DISPLACEMENT OF THE SUN BY ABERRATION PRODUCED BY THE EARTH'S YEARLY MOTION.

It is only the yearly motion of our earth then, always nearly at a right angle to the position of the sun, which displaces this body apparently, but always in the same direction, to the amount of about 20″, to that part of the heavens toward which the earth is moving at the time of the observation; and as this yearly motion is from east to west, like the apparent daily motion, it must cause an apparent displacement of the sun also towards the west, therefore ahead. The daily rotation is retrograding in regard to the yearly motion, for those parts of the earth's surface where it is midday, and accelerating where it is midnight; at the equator this would diminish the sun's aberration less than half a degree, and in higher latitudes even less, therefore the effects of the daily rotation may be neglected.

RECAPITULATION.

Displacement of the sun upward, observed when at the horizon, caused by atmospheric refraction, 30′ of a degree and 2″ in time. Displacement of sun, forward aberration caused by the earth's yearly revolution as any where observed, 20″ of a degree, $1\frac{1}{3}$″ in time. Displacement of sun, backward aberration by daily rotation observed at the equator at noon, $\frac{1}{2}$″ of a degree, $\frac{1}{30}$″ in time. Displacement of sun, aberration by daily rotation observed near the poles, 0.

New York City. P. H. VANDER WEYDE, M. D.

Velocity vs. Power.—The Value of the Indicator.

MESSRS. EDITORS:—I was much gratified with your article on "Shafting and Belts—Absorption and Transmission of Power," in No. 16, current volume. Permit me to make a few remarks on the same subject.

That the indicator does determine, in the only positive and correct degree, the power developed by the steam engine, has come to be an established and indisputable fact. It has necessitated the abandonment of many beautiful theories, both in regard to the length of belts and the velocity of shafting. Many suppose that an engine of say eighty horse power, shou'd work up to its maximum under all circumstances, and yield that amount of useful power, whatever the length of the driving belt, the relative position of driver and driven, or the velocity of the shafting. The engine that drives its shafting at six hundred revolutions cannot be supposed to yield such an amount of power as one that jogs along at one hundred and eighty. Velocity is a great absorbent of power, and in the first case a very large percentage of the real power of the engine is taken up by the friction of the shafting.

An experiment was recently made to determine the relative amount of power required to drive ring spinning frames at differing velocities. The result was as follows: Thirty-six frames of one hundred and twenty-eight spindles each, one and a half inches ring, running at 6,400 revolutions absorbed, exclusively of necessary friction of shafting and engine, 59.36 indicated horse power; at 6,000 revolutions, 52.78; at 5,400 revolutions, 51.21, and at 4,800 revolutions, 47.38, the other conditions being the same in each case.

More care should be used in the proportions of engines, as well as in the arrangement and velocity of shafting. Some engines have their pipes, valves, and ports too small to ever allow an approximation to the boiler pressure. Some users of steam believe that if an engine has a cut-off it *must* work on the expansion of steam to perhaps double its intended capacity. If valves are properly set, and the ports are of sufficient area, we shall not find, so often as we do now, one end of the cylinder doing from sixty to eighty per cent of the work. It is a wonder that some engines run at all, and they would not in some cases perform a revolution but for the momentum of the fly wheel. The indicator is the instrument for ascertaining these difficulties, and the time will come when it will be held in the estimation it deserves. He who makes its manipulation his specialty, should also understand how to remedy the defects his instrument discovers. He should be able to adjust the parts of the engine, and also ascertain the points at which the power is absorbed by improperly placed shafting, belts, and pulleys. T. P., JR.

Providence, R. I.

Cutting Mirrors.

MESSRS. EDITORS:—Your correspondent "A. M. S., of Mass.," in reference to cutting small mirrors from large ones, is evidently an unskilful operator in the use of the diamond. A pure, clean diamond cut will separate silvered plate just as cleanly as ordinary glass, and without in the least degree injuring the silver. Solutions or other preparations are rather injurious than otherwise, owing to the contraction in drying, tending to "drag" the amalgam.

The chief danger in cutting silvered glass, lies in the unguarded manner in which some undertake the work. Secure a steady, level table; spread evenly thereon a piece of cloth or flannel, free from lumps, chips, drops of hardened glue, etc., (so frequent in workshops); measure off the desired size, and with a skillful confidence put in the cut, taking care not to change the angle of the diamond as the hand is drawn toward the body; commence the breaks at the end where the diamond leaves the glass.

A word as to the cutting properties of the diamond might not be out of place in this connection. Not over one-half of those who use this tool do so intelligently. A true diamond cut in ordinary glass, is a beautiful, clear, hair-like line scarce observable, and noticed plainly in silvered glass only on account of reflection. The usual so called "*cut*" with many is a heavy white line, *something they can see*, or they are not

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satisfied. Such a cut is mere *abrasion* of the glass, in the part over which the diamond has traveled.

The cutting point is found, in the ordinary glazier's diamond, somewhere between the perpendicular and the angle at which a pen is usually held while writing. This point must be sought for, and the diamond used only by one person. Here is applicable your frequently urged advice, "study the use of your tools," and have your own "kit."

The natural philosophy of the diamond cut in glass has not yet been satisfactorily explained, though studied over by some of the first minds in this country and in Europe. After the fracture of a piece of well cut glass, the track of the diamond is marked by a serried line (something like saw-teeth) of a beautiful regularity, penetrating to the depth of about $\frac{1}{64}$th of an inch, varying slightly according to pressure. This appearance is quite plain to the naked eye, but under the microscope is the full beauty and much cause for astonishment. Thus seen it presents the idea of the line of holes in a sheet of postage stamps, with the exception that the holes are much closer, and appear as if made with an oval instead of a circular punch. A true cut is the result of much practice and study, and will become familiar by a clear, whistling, somewhat musical sound.

Again reiterating your excellent advice, "Study the use of your tools," and much real pleasure will result in their use. ENTERPRISE.

Cincinnati, Ohio.

Electro Magnetism as a Motive Power.

MESSRS. EDITORS:—I have been for years in receipt of numerous letters of inquiry on this subject, and as the writers are undoubtedly for the most part readers of your journal, permit me to refer them to your excellent report of my experiments at the Tabernacle in New York, found in your paper of November 15th, 1851, Vol. 7, No. 9.

It will be remembered that on that occasion I raised by the axial force of magnetism, with a huge helix, a bar of iron of 2000 lbs. weight, 5 inches from the floor. The bar weighed 800 lbs., the platform fastened to the top of it 300 lbs., and the six men on the platform over 1000 lbs. more. The huge mass I caused to vibrate for an inch by my finger. The bar and helix were the kind used in the engine exhibited. The battery used was 50 pairs Groves with platinum plates 12 inches square, 10 inches immersed. Such an enormous power has never been thus far repeated. Zimmermann, a late German author on electricity and magnetism, ridicules the idea, and says, "*It is an American story, and beats Munchausen.*" It will also be remembered that before this, I started with an electro magnetic locomotive to go from Washington to Baltimore. The car weighed 11 tuns, containing 14 passengers, two axial engines under the passenger seats, and a Groves battery of 100 pairs of the above size, swung on rubber springs underneath the car. On the way out the battery cells gave way, the acids mixed, and this happened twice before we reached Bladensburgh, a distance of six miles. It was for the most part an ascending grade. On a level track we made 19 miles an hour, although the machinery was rude and the friction of the engines and car couplings very great. We deemed it prudent to go no further, and had three more breaks on our way home. The engines were rated at four horse power each. All that can be inferred from the experiment is that the power can be increased on the axial plan to any extent, and that the larger the engines and battery the greater the portion of power obtained. The reverse of this is true in every form of engine which employs *electro magnetic attraction* as a source of power. The larger the magnets and engines the greater the loss of power. I have long since, however, come to the conclusion that a practical working engine cannot be made on any plan where the circuit is broken.

The combustion of metals with a three or four horse power is terribly rapid at all the breaks in the cut off. The magnetism must be unchanged and the current unbroken to get a working engine, if it can be obtained at all; and the battery must be constant and convenient. The cost per diem is not the real question. Produce a reliable working engine of even half a horse power, and it will be used in many places with great convenience, and in some with profit, even if it should cost twenty times the amount of steam in a Cornish engine. I need not dilate upon this part of the subject.

CHARLES G. PAGE.

Washington, D. C.

Casting Metal in Plaster Molds.

MESSRS. EDITORS:—When reading No. 13, current Vol., on page 201, I see one of your correspondents speaks of plaster of Paris for molds for castings of low fusible metals, and recommends that the mold be subjected to a heat of 400° F.

I must differ with the writer. I have had some experience in the use of plaster of Paris for molds, and I found the best plan was to dry the molds perfectly in open air. When about to use them, I warm them just enough so that they would not chill the metal when poured in. After warming I held them over a flame that produced a good deal of smoke, until the inside of the mold was completely blackened over. Then I could get about two hundred castings from each mold, after which the plaster became soft and small particles broke off. Upon examining I found the plaster was burnt and of no further use for molding purpose. A. C. SMALL.

Augusta, Ga.

Water Rams.

MESSRS. EDITORS:—As a more full reply to the correspondent, p. 167, about the water ram, we may say that a good water ram yields 60 per cent of the water expended, thus: that it yields 60 per cent useful effect of the mechanical power expended. This mechanical power and effect we obtain, of course, by multiplying the weight of the water by the height it falls or is raised. For instance, let 100 lbs. of water fall 3 feet, the power is represented by 300; this will raise 6 lbs. 30 feet, of which the mechanical effect is represented by 6×30, or 180; now 180 is 60 per cent of 300; and so the mechanical effect is 60 per cent of the power expended.

M. P. P., of E. W., Mass., states that he finds that his ram raises by a fall of 3 feet about one-sixth of the water expended, some 30 feet; this would for 100 lbs of water expressed be 16 lbs. raised. The mechanical power is here 3×100, or 300; the effect is expressed by 16×30, or 480; more than three times the effect of the best ram, and 60 per cent more than the power employed, which evidently is an absurdity. If this was so, he could obtain from the water thus raised more power than from the original fall; and being able to raise easily six times the amount of water to only one-tenth of the hight, he would possess perpetual motion of the hydraulic kind. Evidently our correspondent overestimates the amount of water raised, and it should, according to the other circumstances mentioned, read $\frac{1}{16}$ in place of $\frac{1}{6}$.

Screw Threads---Honor to Whom Honor is Due.

MESSRS. EDITORS:—In your edition of April 25th I notice an article entitled "Screw Threads and Bolts—A Uniform System," in which you speak of my system. Doubtless you have before you one of my drawings of the Franklin Institute System, which I published about one year ago, and which has come into very general use in many parts of the country. Now I am not in any way responsible for this system, nor would I claim the honor of originating it.

The committee who prepared this system had it under investigation from April 21, 1864, to December 15th of the same year, when it was reported to and adopted by the Institute and the committee discharged. It consisted of the following named gentlemen: Wm, B. Bement, Chairman, firm of Bement & Dougherty; C. T. Parry, Superintendent Baldwin's Locomotive Works; J. Vaughn Merrick, firm of Merrick & Sons; John H. Towne, firm of I. P. Morris, Towne & Co.; Coleman Sellers, Engineer Wm. Sellers & Co.; B. H. Bartol, Superintendent Southwark Foundery; Edward Longstreth, Foreman Baldwin's Locomotive Works; James Moore, firm of Matthews & Moore; Wm. Sellers, firm of Wm. Sellers & Co., and Algernon Roberts, of the Pencoyd Iron Works. The above committee have given good reasons for the adoption of this system as stated in my circular, and in view of all the facts it is due to them, and to the machine making public, to yourselves and to myself, that this explanation be published, believing that you wish to do justice to all concerned in this matter. EDWARD LYMAN.

New Haven, Conn.

Why is it?---Water vs. Beer.

MESSRS. EDITORS:—I have frequently amused myself by arranging a row of common glass tumblers, and pouring a greater or less quantity of water into each, thereby producing the different tones of the diatonic scale. But the other day on attempting the same experiment with ale, I found that the sound was deadened—that on striking the tumblers there was no vibration, the effect being as if they were cracked. Can you inform me why ale should thus check the vibration, while water only alters the pitch of the tones without destroying their ringing quality? O. T. A.

Geneva, N. Y.

[Beer is to some extent gelatinous in consistency and thus cannot give the ring of the more mobile water.—EDS.

Editorial Summary.

AMMONIA IN COAL GAS.—Dr. Gunning of Amsterdam, calls attention to the fact that coal gas, however well purified, is by no means free from ammonia. The result of some experiments he has conducted, shows the existence of a little over one cubic foot of ammonia, or ammoniacal substances, in every one thousand cubic feet of gas. Attention is called to the fact that where wet gas-meters are in use, the water, being rarely if ever changed, must in time become fairly saturated with ammonia. A meter used for two years in the laboratory at Amsterdam, with a capacity for fifty-seven gallons of water, held no less than nine pounds of these bases. Since coal gas also contains sulphur compounds, there is formed sulphate of ammonia, which, converted by the intense heat into bisulphate of ammonia, attacks the glass cylinders, or chimneys, placed on the Argand gas burners.

CHLORIDE OF COPPER is now extensively used in Germany as a preventive against the cattle plague. The mode of administering the specific is as follows: A solution is first made by dissolving one quarter ounce of the green crystalized salts in spirits of wine. In this solution a pad of cotton is soaked for a time, and is then laid on a plate and set on fire in the center of the stable, the animals' heads being turned toward the flame, so as to make them breathe the fumes. The operation is performed morning and evening, and a spirit lamp filled with the solution left burning in the stable every night. The liquid is also administered internally, with the addition of one half ounce of chloroform for the above quantity, a teaspoonful being put into the animal's drink three times a day.

EXPERIMENTS WITH CATERPILLARS.—A late experiment in the southern part of England has proved that the ordinary caterpillar cannot be made available in yielding, like the silk worm, a profitable article of merchandise. Plantations of ailanthus trees were set out, and many eggs were procured. After hatching, the young caterpillars fed plentifully, attained their growth, and finally made cocoons. So far all was encouraging, but, on unwinding, it was found that unlike the cocoon of the silkworm proper, which sometimes yields a thread two thousand yards long, the filament from the caterpillar cocoons was in short lengths, necessitating carding in order to arrange the fibers, a process very expensive, and furnishing a weak, lusterless material when finally woven.

CURE FOR WHOOPING COUGH.—Physicians in Hartford, Conn., have adopted with marked success a new method of treatment for curing children afflicted with whooping cough. The juvenile patients are taken on a tour of inspection to the city gas works, and while intently engaged in witnessing the various processes employed in manufacturing their evening's artificial-illumination supply, they breathe the not very pleasant air of the gas house. In some way, not very clearly understood, the inhaling of this air is found to cure or greatly alleviate the complaint. This ingenious method of benefitting the youthful mind and body simultaneously has become immensely popular in the place, the people at the gas works asserting that during the last twelve months no less than three hundred cases have been experimented upon, the results, generally, being of a most favorable character.

EFFECT OF EXPOSURE ON COAL.—Prof. Rockwell, has called attention to the deterioration which coal suffers from exposure to the weather, and to the importance of keeping it as dry as possible. Anthracite suffers the least; bituminous the most. According to the experiments of Grundmann, in Germany, coal exposed to the weather in heaps lost during a period of nine months 50 per cent of its value as fuel, and about as much as a gas making material; it undergoes a process of slow combustion, taking up oxygen, and giving off the volatile products of oxidation,—air and moisture playing the principal part, and warmth promoting it; the valuable combustible ingredients are lost, and the injurious ones, as sulphur, oxygen, and ash, are relatively increased. Coke from weathered coal is of inferior quality, losing its coherence.

A WEATHER TOY.—A Bostonian, says the *Commercial Advertiser*, has a toy barometer on exhibition, which consists of a miniature cottage, with two doors. At one of these stands a man, clad in such purple and fine linen as constitute a Sunday-go-to-meeting garb in New England, while at the other appears a female arrayed in like apparel. These twain seem to watch the impending weather. If there are signs of rain, the man, with a noble bravery worthy of a better fate, steps boldly out of doors, while the woman shrinks into the cottage. But if the signs are favorable, the woman goes forth to shop and gossip, while the man stays at home and tends house and baby. A thermometer forms part of the household furniture of this institution.

FRENCH OPIUM. It has been demonstrated in France that opium can be extracted from the poppy, the greatest and almost the only drawback to its profitable manufacture, being the frequency of rains occurring at the time when incisions have been made in the stems, whereby a large portion of the juice is either lost or spilt. Lately M. Lallier has tried the plan of pulling up the plants by the root, in the proper season, and bringing them under shelter, where the incisions may be made regardless of the weather. The plan has answered beyond expectation, and the roots being kept in water during the process, a larger proportion of milky juice is obtained than usual.

THE MEDALS and diplomas awarded to the American exhibitors at the late Exposition, are now on exhibition in Washington. The collection is one of great interest, comprising four crosses of the Legion of Honor; three grand prizes; fifteen gold, seventy-four silver, and ninety-five bronze medals; two hundred diplomas, and a series of photographic views of the Exposition. One silver medal was decreed to the United States government for specimens of settlers' houses; a bronze medal was also struck for the Agricultural Bureau, and one gold medal was awarded to the "*Industrie armoirière des Etas-Unis d'Amérique.*

A NEUTRAL MAGNETIC CHAMBER.—Faraday has shown that if a small cubical space be inclosed by arranging square bar magnets, with their like poles in apposition, so as to form a chamber, within that space all local magnetism inferior in power to the magnets employed, will be neutralized. The same effect may be obtained with electro-magnets as with permanent magnets, and it is proposed in the *Mechanics' Magzine* thus to inclose the compass of an iron ship, as a remedy for the deviation by local attraction. A battery might be constructed to be excited by the sea water flowing through it, requiring no attention as long as the zinc plates lasted.

ENGLISH TELEGRAMS.—The uniform rate for transmission of messages throughout the United Kingdom,—provided the English government decide to take the telegraph lines under its charge,—is not to exceed one shilling for every twenty words, irrespective of the distance sent, and exclusive of the names and addresses of senders and receivers; the same charge also including the cost of delivery by special messenger, within one mile of the terminal office.

STEEL BILLIARD BALLS.—Among other new uses of steel, one of the latest, as we learn from a foreign cotemporary, is the employment of this metal in the manufacture of billiard balls, in place of ivory. Such balls are recommended for their great elasticity and their freedom from any liability of cracking.

CARBOLIC ACID.—A correspondent of the *Lancet* testifies that among the many other virtues of this substance, is its value in odontalgia, or, less technically, toothache. To one drachm of collodium flexile add two drachms of Calvert's carbolic acid. A gelatinous mass is precipitated, a small portion of which inserted into the cavity of an aching tooth invariably gives immediate relief.

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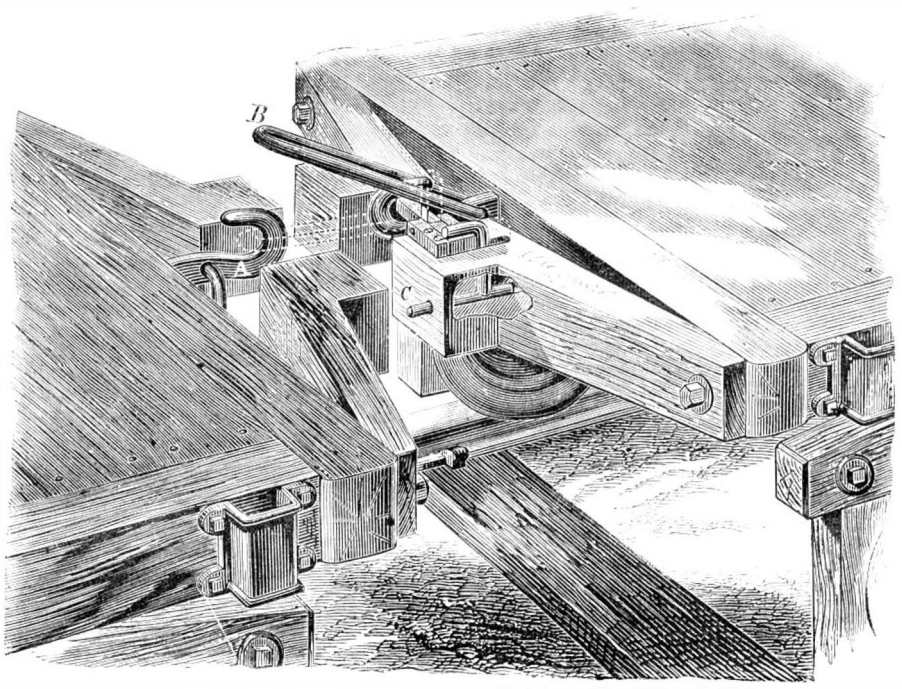
AMERICAN INSTITUTE POLYTECHNIC CLUB.

The greater part of a recent evening was occupied by a long lecture on longevity, of which the points of interest may be condensed in a few words, viz: 1st. That persons whose ancestors have long lives live long themselves, and *vice versa;* a fact well known. 2d. That persons with large, well developed trunks live longer than those with small trunks and short necks. 3d. That large noses and the ears low down on the side of the head is also a sign of longevity. The lecturer stated that he had taken the trouble of investigating these points during the last thirty years, among more than 200,000 people, and so far we have no fault to find, but object to a person spinning out three or four facts, which he can state in as many minutes, to a long address of more than an hour, and aiming chiefly at amusing the audience more than instructing them; even the amusement aimed at was of doubtful character, as the speaker said too much about himself, how he had too small a nose and too short a neck; how his ribs were too horizontal, so that he could not breath with his chest, but only with his abdomen. He complained that people commenced calling him an old fellow; said that his little fingers were crooked, which he demonstrated by exhibiting them repeatedly, that all his family and ancestors had such crooked fingers, etc. We confess we do not see the usefulness of this information for people who come to the Polytechnic Club to be instructed, but think that they care very little about the knowledge of these facts. Some of his arguments were rather unique; for instance, to explain hereditary tendencies, he proposed the question why a dog was a dog, and answered it by saying, because his father was not a cat.

Improvement in Self-Acting Car Couplings.

Although fearful accidents continually occur in the running of trains of cars, by which passengers are maimed and killed, and the records, with all the horrible details, are spread far and wide by the press, the injuries of railroad employés received in the performance of their duties are not so prominently noticed, and consequently comparatively few appreciate the extent of these accidents. Yet one cannot spend a day among railroad men without finding specimens of crippled humanity injured for life by some accident received while attending to the duties of their position. One of the most dangerous of these duties is that of going between cars for the purpose of coupling or uncoupling. The object of the inventor of the coupling herewith illustrated is to entirely prevent the possibility of such accidents, by providing a self-acting coupling.



WEILER'S PATENT COUPLING FOR RAILROAD CARS.

At the base of a hook, A, secured to the end frame of a car platform or to the draw-bar, is pivoted a link, B, which engages with the hook of the next car. In operation the link is supported at an angle above a horizontal by the long arm of a latch lever pivoted between suitable blocks on one of the bumpers, the other end being sustained by a right-angled catch, the horizontal end of which, C, projects beyond the bumper in which it is seated when the link is supported in the position described above. The link being in this position, the bumper of the next car will strike against the projecting end of the catch, C, and, driving it in, release the link, which will fall by its own gravity and engage with the hook on the next car. The dotted lines in the engraving show the position of the parts when the cars are coupled. The bumpers may be made as show in the illustration, or as ordinary bumpers are made, in either case giving some elasticity, sufficient to relieve the shock of collision when the cars come together. The length of the upper part of the hook is sufficient to prevent accidental uncoupling on grades or curves. While one link is engaged that on the next car hangs free. The simplicity of this contrivance is such that it may be adapted to any car without radical alteration of parts, and it is adjusted from the car platform.

It was patented January 25, 1868, by Wm. Weiler, whom address for further particulars at Washington, N. J.

CONTROLLING WATER CURRENTS---DEEPENING THE CHANNELS OF RIVERS.

We have received a pamphlet issued by the New Orleans Academy of Sciences, containing a plan for deepening the mouths of rivers and reducing the hight of bars in navigable streams. It is illustrated by engravings, and the plan is based upon the well known mechanical law, "the angle of incidence is equal to the angle of reflection." Taking advantage of this law, in its action upon all movable bodies, the author of this plan, Lieut. E. Manico of the British Royal Marines, recommends the construction of jetties or dams built at an angle to the stream, the action of which shall be to divert the course of the current and confine it within certain limits.

He proposes to build caissons of iron or wood filled with stone, or heavy ballast, whose weight will hold them down, and whose angular forms prevent them from being moved by the currents or waves of strong or stormy waters. They are cubes of any dimensions, single, or joined together in the form of the letter L, or T, or any other that may be desired, or single cubic yards holding half a tun's weight, or eleven hundred pounds of stone. The crates in which queensware is usually packed for commerce, will give one a good idea of their form. Their cubical shape, and crossed bars of iron, or wood, possess many advantages for the work of "rip raps," or regular foundations for all submarine structures, whether jetties, breakwaters, forts, or light-houses upon bottoms of mud, sand, or rock. They are used by the British Government for such works on tempestuous and rock-bound coasts, but they are especially suited for such a bottom as that of the bed of the Mississippi, and of the bars at its mouth. Their ribbed planes prevent them from sinking deep into the mud or sand, and their ribs, and angular points and edges, hold them firmly upon rocks, or soft bottoms. Their cross bars furnish holds for the hooks of cranes by which they can be lowered down and placed with the regularity of bricks in a wall, or like the stones of the pyramids, terrace above terrace, or they can be chained together, or dropped irregularly and held by their angular points to make a submarine spine or *ridge*, against which loose stones may be dropped, and piled at an angle of 45°. Let them be dropped, or placed upon any bottom, or in any current, and experience proves that they cannot be moved by water. Every interstice between the stones they hold becomes filled with mud and sand, until the whole caisson is like a solid stone. Such an object, which cannot be removed by a current, controls it. The water fills and surrounds it with deposit. It is isolated, and made a bar, or island; and it turns the current in another direction. The wreck of a vessel, with its ribbed and angular skeleton, produces a similar effect; and sometimes becomes a dangerous impediment to navigation. One has recently made itself an obstruction to the navigation of the South-west Pass. It has divided the current and is forming an island in mid-channel.

Whether it is desired to make them of iron, or wood, inexhaustible supplies of cypress timber are convenient to us; and forests of it cover the bottoms of the Mississippi and its tributaries. The bluffs of stone above, forming its cliffs, and those of the Ohio and Tennessee, and the yet nearer and more accessible rock of the Washita in Catahoula parish, La., will afford us cheaply all the rock needed to construct jetties of any size, or length, at the mouth of the passes.

Mr. Halliday, the chairman of the committee says:—"I cannot recommend the extension of parallel works. *They would exert no eroding power* such as will be produced by converging walls, reflecting the water from both sides, and throwing it with accumulated force upon a central line. Another objection is the danger of undermining. If a log, or the wreck of a vessel should sink diagonally between these walls; or if, what is more to be apprehended, a *mud lump*, one of those phenomena of our Delta, which Thomassey terms the "evil geniuses" of the passes, should be upheaved by the weight of the deposits, by gas, and artesian pressure, in the channel, the current would be deflected against one of these walls, and perhaps be reflected from it against the other, and undermine it, and destroy the work.

A better plan for their extension is, to throw out diverging flankers, and then perfect converging flankers ending in converging parallels to the original jetties.

This will continue the convergence of the water, and its erosive action, so far and so long as it may be necessary. The important desideratum supplied by Manico's patent, is a material which will not sink in soft mud and sand; and which cannot be removed by water from the hardest rock. The ribbed planes and sharp edges of their bars, the angular points of the rocks they enclose, and the angles of the cubic caissons effectually prevent them from both. Like the knotted toes, sharp nails, and outspread webs of the feet of the alligator and duck, they cannot sink in mud, or sand; and they cannot slip and be moved from a foundation of rock.

These patented caissons, I learn, have been used by the British Government to form the foundation of the most important light-houses on the East coast of England—the Goodwin lights, off the Island of Thanet, constructed upon the treacherous Goodwin sands, where the straits of Dover enter the North sea, in sight of which vessels from every continent must pass to enter the Thames. They have made a permanent foundation there which stands the shock of the storms which beat upon it from the coasts of Scandinavia, and the Arctic Ocean; and they will resist equally well the ground swells and the Typhoons of the Gulf of Mexico.

Wherever they are sunk, they will remain forever, unless lifted up by very powerful machinery, applied very soon after their deposit. For they become immediately filled; and their materials compacted with sand, clay, shells, and whatever else the water can drive into them; and even in the salt water the *teredo* would have but a short time to work upon their ribs, if made of wood, before they would be buried in the mass of deposit heaped by the waves against them and upon them. One important advantage secured by the construction of the jetties at the mouths of the passes, would be the permanency of the work. The new land would be made rapidly, and attach the jetties themselves to the permanent shore. Storms from the south-west might make temporary deposits and slight obstructions at the mouth of that pass; but as soon as the storm shall have subsided, the strong river current passing over the bar, at a rate varying from $1\frac{3}{4}$ to 3 miles per hour, condensed and accelerated by the converging jetties, will sweep them away into the deep waters of the Gulf. The Mississippi river, with a current of 4 miles per hour a short distance from the south-west pass, has cut itself a channel from 60 to 120 feet deep. It is self-evident that if it can be confined between converging dams, and extended into the Gulf, it will make for itself a similar channel where the bars are now formed.

The expense of the work is easily estimated, and when the benefits are considered which would accrue to the whole valley of the Mississippi, now occupied by 17,000,000 of inhabitants, and to the millions more in our own and other lands interested in its priceless commerce, the sum of 1,000,000, which would more than cover all the cost of removing the principal obstruction, the bars of the South-West Pass, seems contemptibly small."

Primitive Climate of the Earth.

The primitive atmosphere of the earth was greatly richer in carbonic acid than the present, and therefore unfit for the respiration of the warm-blooded animals. The agency of plants in purifying this atmosphere was long ago pointed out, and the great deposits of fossil fuel have been derived from the decomposition of this excess of carbonic acid by the ancient vegetation. In this connection the vegetation of former periods presents the phenomenon of tropical plants growing within the Polar Circle. Prof. T. Sterry Hunt considers as unsatisfactory the ingenious hypotheses proposed to account for the warmer climate of ancient times, and thinks that the true solution of the problem is to be found in the constitution of the early atmosphere, when considered in the light of Dr. Tyndall's researches on radiant heat. He has found that the presence of a few hundredths of carbonic acid gas in the atmosphere, while offering almost no obstacle to the passage of the solar rays, would suffice to prevent almost entirely the loss by radiation of obscure heat, so that the surface of the land, beneath such an atmosphere, would become like a vast orchard house, in which the conditions of climate necessary to a luxuriant vegetation would be extended even to the polar regions.—*Mechanics' Magazine.*

The Woodpecker's Foresight.

The woodpecker in California is a storer of acorns. The tree he selects is invariably of the pine tribe. He bores several holes, differing slightly in size, at the fall of the year, and then flies away, in many instances to a long distance, and returns with an acorn, which he immediately sets about adjusting to one of the holes prepared for its reception, which will hold it tightly in its position. But he does not eat the acorn, for, as a rule, he is not a vegetarian. His object in storing away the acorn exhibits foresight, and knowledge of results more akin to reason than to instinct. The succeeding winter the acorn remains intact, but becoming saturated with rain, is predisposed to decay, when it is attacked by maggots who seem to delight in this special food. It is then that the woodpecker reaps the harvest his wisdom has provided, at a time when, the ground being covered with snow, he would experience a difficulty, otherwise, in obtaining suitable or palatable food. It is a subject of speculation why the redwood cedar or the sugar pine is invariably selected. It is not probable that the insect, the most dainty to the woodpecker's taste, frequents only the outside of two trees; but true it is, that in Calaveras, Mariposa, and other districts of California, trees of this kind may be frequently seen covered all over their trunks with acorns, when there is not an oak tree within several miles.—*A. B. Barton.*

Coloring of Zinc Plates.

A variety of beautiful colors, corresponding to those of the rainbow, can be imparted to zinc surfaces by a simple chemical application continued a length of time proper for the desired color. It is necessary that the metal be pure, and especially free from lead. It is therefore to be rubbed with siliceous sand moistened with hydrochloric acid, then dipped in water and rubbed vigorously with blotting paper. The zinc is then immersed in a solution of 3 parts by weight of dry tartrate of copper in 4 parts caustic soda, with 48 parts distilled water, the whole at a temperature of about 50° Fah. The colors will appear successively, in the prismatic order, according to the period of immersion. In two minutes, the violet will appear; in three, dark blue; in four and a half, a golden yellow; in eight and a half, a red purple. Intermediate terms give intermediate tints. When colored, the zinc is well washed with water, and for greater permanence of color may be varnished.—*Annual of Scientific Discovery*, 1868.

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A Novel Gunboat.

A boat named the *Staunch*, built for the Admiralty upon the proposition and plans of Mr. Rendel, of the firm of Sir W. Armstrong and Co, has just been tried off the Tyne. A correspondent gives us the following account: "This vessel, though wholly insignificant in appearance and cost, represents some very novel principles. She is only 79 feet long and 25 feet beam; her draft of water when loaded of 6 feet, and her displacement 150 tuns. She has twin screws driven by two pairs of condensing engines of 25 horse-power (nominal) combined, giving her a mean speed of 7½ knots. Such being her dimensions and power it is hard to suppose that she can be in the least degree formidable. She carries, however, as heavy a rifled gun as any in the navy, and to all appearance carries it most efficiently. The gun, a 12½ tun 9 inch Armstrong, is mounted in the fore part of the boat in a line with the keel, and fires through a bulwark or screen over the bow, which is cut down and plated something like that of a monitor. Thus placed, it is easily worked in a rolling sea, and its change of position by recoil does not appreciably affect the trim of the vessel. At the same time, to provide for heavy weather, it is made capable of being lowered into the hold, so as to relieve the little vessel of its deck load, and enable it to carry the weight as cargo. Machinery is also employed for the purpose of working the gun, by which means more than half of the ordinary gun's crew can be dispensed with. It is in these mechanical arrangements that much of the interest of this vessel lies. The operation of lifting and lowering is performed by simple but powerful machinery. During the trials the gun, with its carriage and slide, and the platform carrying them—weighing in all 22 tuns—was raised and lowered in a rough sea, with the boat rolling 11° each way, in from six to eight minutes. When the gun is lowered the gun well is closed and the deck left perfectly clear, but in a few minutes the gun can be again brought up ready for action. During the trials the 12½-tun gun was easily handled by six men, and fired with extra charges of 56¼ lbs. of power and 285 lbs. shot. It must be observed that very little, if any, training is requisite with the gun of the *Staunch*. The vessel is so small as to be a sort of floating gun carriage. Her twin screws enable her to turn rapidly in her own length. Her helmsman is placed just behind the gun. The gun, therefore, can be laid by rudder right and left with far more ease and speed than any gun of similar weight otherwise mounted. During the recent trials, with the engines driving reverse ways, the vessel made the full circle in her own length in 2¾ minutes. With both engines going full ahead she made by the helm a complete circle of seventy-five yards diameter in 2¼ minutes. The *Staunch* is wholly unarmored. Her strength and security lie in her great gun and her diminutiveness. And she must be considered as one of a flotilla of similar vessels. Sixty such could be built at the price of a single armor-clad frigate, and ten of them, acting from different points, doubling in their own length, escaping into shallows, sheltering under forts, would drive off or render a good account of any hostile vessel venturing to attack our harbors. Primarily they are intended for harbor defence; but the power of lowering the gun and carrying it as cargo, would afford great security for these vessels at sea, and enable them to be sent from harbor to harbor with safety. The *Staunch* is now to be sent round to Portsmouth, where she is to be attached as experimental gunboat to the gunnery ship *Excellent*."—*Pall Mall Gazette.*

Trial and Loss of a Self-Propelling Vessel.

A San Francisco letter in the N. Y. *World*, says that a Mr. Robinson has from time to time, in the papers, put forward an invention which he claimed was to be almost self-propelling, without the use of steam power. The peculiar features of the new aquatic craft was, that two or three boats hitched together, one behind the other, by the action of the waves the series of boats was to obtain propulsive power. An experimental craft was built at an expense of about $8,000. Considerable curiosity was felt in the community as to the success or non-success of the new notion, and many went to view the craft during construction. If it succeeded, a revolution was to be worked in navigation. Sails and steam would be superseded. On the ocean and great lakes the rougher the sea the faster the boat would travel.

The inventor was sanguine that his new craft would travel the water by its innate propulsive power, independent of steam or other expensive motor, enjoying the tempest and glorying in the storm. The craft was completed, and the day for the trial trip appointed. So confident was the inventor of success that he took on board stores for a ten day's voyage. At ebb-tide the new (to be) sovereign of the seas put off from the wharf to which she had been fast since her construction had been completed, and started out on her voyage. There were on board four persons: the inventor, Captain Young (a pilot), and two sailors. She was hardly clear of the wharf when she swung around broadside to the tide and commenced a series of movements not very promising of success to the undertaking. She would not obey the helm at all, but lurched continually, in an uncomfortable manner for those on board; first one wheel house would be submerged, then the other. The new craft made excellent time, proceeding endwise like a crab, but the wheels seemed to have no effect whatever on speed or direction. The wheels, depending upon the water they were passing through for motion, would turn any light machinery on board the boat, but would not move the boat ahead an inch. The craft would simply move with the water, not through it. The inventor was still sanguine that, with regular waves, the boat would be an assured success. All he required was regular waves. Once outside among them, things would change; the rougher it became the better. The boat went on like a raft until it got outside the heads, then over the bar into rough water, and no sooner was it in rough water than the whole contrivance was turned over. The party on board sought the water for safety, and clambered into a boat which had been taken in tow in case of accident. The pilot boat *Caleb Curtis* picked up the unfortunate navigators. The steam tug *Rescue* came alongside the *Curtis*, and offered to tow the refractory craft up to San Francisco for $500, but Mr. Robinson did not seem disposed to give so much, so the unfortunate craft went on toward the resting sun, keel upward. Mr. Robinson is reduced to poverty by the result of his ill-starred experiment.

Earth Circuit in Telegraphy.

The failure of the earth circuit of a short telegraphic line in the Pewabic copper mine, Lake Superior, is interesting from a practical point of view. The wire used was a one-sixteenth inch copper wire, wound in the same manner as waterproof fuse, the wire taking the place of the powder. To the surprise of all, no signals could be transmitted through the line. The end of the wire underground was put into a hole drilled into the rock and tamped in; a bed of earth was then made, and lastly a pool of water tried, but all to no effect. Above ground the line worked well enough.

Though the earth, generally speaking, will conduct electricity, some substances, of which any specific portion of the earth may be composed, will not conduct it; for example, dry sand and dry freestone rock will not, and quartz rock will not any more than glass; dry earth will not, as is recognized by all telegraph constructors, who bury the earth plates deep in damp earth. In this case an attempt was made to form an earth circuit in non-conducting material. The end of the wire in the mine was tamped into the solid rock, probably quartz, which would be about the same as tamping it into a glass bottle, filled with earth or water. The chances of electric communication would be still less, if the wire was not perfectly insulated in its whole length. The remedy would be to make a return circuit of insulated wire.—*Mechanics' Magazine.*

Mirrors Without Mercury.

The ordinary method of preparing looking glasses is with an amalgam of tin and mercury: four parts of tin to one of mercury.

In the invention, reported by M. Salvetat to the Society of Encouragement, in Paris, neither mercury nor tin is used at all. The tinfoil is replaced by platina, not applied in leaf form, of course, but chemically, in a metallic and brilliant powder. The operation is perfectly simple. The glass, having been carefully cleaned and polished, is covered, by means of a brush, with a mixture of chloride of platina, essence of lavender, and a dissolvent composed of litharge and borate of lead. When dry, the glass is placed in mufflers, when the essence, being volatilized, leaves a deposit of platina dust firmly united to the glass. While two or three weeks are necessary for the manufacture of ordinary mirrors, the new process only requires a few hours.

Insect Fabricators of Iron.

It is well known that some insects are skilful spinners, but it was not known that some of them fabricated iron. A Swedish naturalist, M. de Sjogreen, has published a curious memoir on this subject. The insects in question are almost microscopic; they live beneath certain trees, especially in the province of Smaland, and they spin, like silk worms, a kind of ferruginous cocoons, which constitute the mineral known under the name of "lake ore," and which is composed of from 20 to 60 per cent of oxide of iron mixed with oxide of manganese, 10 per cent of chloric, and some centimeters of phosphoric acid. The deposits of this mineral may be 200 meters long, from 5 to 10 meters wide, and from 8 to 30 inches thick.—*Rev. de Thérap. Med. Chirurg.*

MANUFACTURING MINING, AND RAILROAD ITEMS.

A report by the superintendent of the geological survey of India, shows that the British territories cannot be considered as either largely or widely supplied with coal. He ascertained that extensive fields existed, but they were not distributed generally over the districts of the Indian Empire. In the opinion of the superintendent, the very best coal from India only touches the average quality of English coal, and, moreover, the former is not capable of more than two thirds, in most cases not more than one half, the duty of the English coal.

The distance between London and Paris is now traversed daily by the South, Eastern and Northern of France railways, in less than ten hours. Two express trains leave the Paris terminus of the Northern of France system daily for England. More than 200,000 passengers passed over this route in 1867.

Among other sequences of the passage by the State Legislature of the Erie bill, is the prompt finishing of the Albany and Susquehanna railroad, now destined to become virtually a branch of the Erie road, running from Binghampton to Albany. The bill just passed requires the money received from the recent issues of bonds to be expended on the road, and as a consequence of this provision, and the late terrible tragedy caused by a broken iron rail, the entire Delaware division of the road is to be relaid with a double track of steel rails.

The London *Colliery Guardian*, speaking of the presence of phosphorous in the Cleveland iron, which so seriously reduces its market value, and renders it necessary to bring iron from other districts to mix with it in the puddling furnaces—calls for some method of removing this sulphur, showing that if extracted, even in its lowest priced form—as a manurial ingredient—it would be worth at least $330 per tun. There is, therefore, a tolerable good margin for working expenses, while the iron now worth $12 per tun, and containing one per cent of phosphorus, would, if freed from this element, be worth at least as much as hematite iron, or say 13.50 per tun.

Engineer Roebling thinks that railroad draw bridges are a nuisance, which can readily be done away with. He would substitute high bridges, even with steep approaches, a stationary engine and a wire rope being provided to assist the trains over the rise. In other words, treat the bridge like an inclined plane, and draws will be unnecessary.

A new railroad project is exciting the wide-awake capitalists of Pittsburgh, Pa. It is proposed to build a road from Pittsburgh to Newbern, N. C., along the Monongahela river to its source in West Virginia; thence by Greenbrier Mountain and river to the junction of the latter with New River, and thence to Newbern. The road would penetrate a rich mineral region, and would bring large quantities of iron ore to Pittsburgh

The Metallic Cartridge Company, of East Bridgeport, Conn., have a contract from the government of Brazil for 6,000,000 cartridges. They have now supplied two thirds of the order, and after shipping the remainder the company will immediately begin the manufacture of 7,500,000 for the Russian government. The daily product of the works at present is 150,000 to 170,000 cartridges.

The Allentown Rolling Mill is one of the largest establishments of the kind in Pennsylvania. It is for the production of railroad iron exclusively, and turns out four hundred tuns of rails per week. The daily work is two hundred and sixty-six rails, thirty feet long and weighing fifty-six pounds to the yard, or five hundred and sixty pounds each.

The rails of the Union Pacific railroad are now being laid on the descending slope of the Rocky Mountains, the summit of the Black Hills, the highest point of the system being crossed on the 16th ult. According to Blickendorff's survey, the railroad crosses the mountains at this point at an elevation of 8,242 feet, being, as we have before had occasion to state, the highest point reached by any railroad in the world.

Professor Chapman, of Toronto, writes that he has discovered gold on Lake Superior, the metal existing in certain specimens of galena and copper pyrites, occurring together in well defined veins in the region of Black Bay. Surface specimens entirely destitute of "free" or visible gold, show a value of nearly $21 per tun, irrespective of the large amount of lead and copper present in the ore. The rocks are identical, in general age, with the gold bearing rocks of Nova Scotia.

All the conductors on the New York and New Haven railroad have made their appearance in new uniforms, furnished by the company. The largest part of the road lying in Connecticut, the law of this State, requiring railway officials to be thus distinguished, does not affect this company, and hence their action in this matter is the more to be commended. In this connection we note that our Legislature has empowered railroad conductors with the authority of special policemen, the better to preserve order on the railway trains. We hope they will use their authority by arresting some of the numerous pickpockets who infest the trains out of New York.

The Mount Washington Railway, in the White Mountains, was completed last fall one mile and thirty rods of the three miles up the mountain. For the next mile the tracks are covered with snow two feet deep. The number of hands will be increased in three weeks from fourteen to fifty. The present estimate of the cost is $100,000, though the figures may add differently at the completion of the work on the 1st of September. The road is built on what is known as the "Marsh" plan, illustrated in Vol. X., No. 10.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

MACHINE FOR MEASURING CLOTH.—George R. McIntire, Houghton, Mich In this invention the cloth is placed between two rollers, which are rotated by its motion, and the revolutions of which are recorded by a registering apparatus.

WATER WHEEL BUCKET.—Jacob Clark, Clarksville, Pa.—In this invention the bucket has two curves, one of which receives the direct impulse of the water as it enters the bucket, the other receiving an indirect or "reacting" impulse, as the water leaves the bucket.

SHINGLE MACHINE.—Smith Head, Halifax, Pa.—This invention has two carriages and two sets of saws, and cuts a shingle at each forward or backward motion of either carriage. It has a new apparatus for adjusting the bolts to the saws, and a new edging apparatus.

CORN PLOW, PLANTER, AND CULTIVATOR.—Isaiah B. Arthur, Sidonsburgh, Pa.—This invention combines a new arrangement of the plows' cultivator guards, and covering roller, with a new and greatly simplified method of operating the seed distributor.

CRYSTAL FOUNTAIN.—J. C. Johnson, Louisville, Ky.—In this invention the water is mingled with air in the apparatus, and is found in the form of beads or spray from the fountain, forming a beautiful jet for scenic and ornamental purposes.

SAFETY TRUCK.—S. Y. Bradstreet, Monticello, Iowa.—This invention has for its object the prevention of railroad cars from bouncing off of the track, and consists in the employment of an auxiliary truck of peculiar construction, which guides the main trucks, and which cannot by any ordinary obstructions be thrown off of the rails.

NAILS.—F. Davidson, Richmond, Va.—This invention relates to a machine for making cut nails, and it consists in a peculiar construction and arrangement of parts, whereby a very simple and efficient machine for the purpose is obtained.

LOCK.—H. H. Elwell, South Norwalk, Conn,—This invention relates to a lock of that class which are provided with a reversible slide catch so arranged that it may be adjusted to suit either a right or left hand door—that is to say, be capable of being applied to a door which swings in either direction. The object of the invention is to obtain a lock of the kind specified, which will be simple in construction, and which will not be liable to get out of repair, and require but a simple manipulation to adjust the slide catch as circumstances may require in applying the lock to the door.

SAWING MACHINE.—Thomas Jenkyn, Thetford Centre, Vt.—This invention consists in a novel arrangement of circular saws and rotary cutters, in connection with frames and tables, whereby a machine is capable of performing various kinds of work, such as slitting boards, planks, or other stuff, cross-cut sawing, the cutting of shoulders or tenons, grooving or beading, and chamfering or cornicing.

CLOTHES WRINGER.—M. Pierce, Winona, Minn.—This invention relates to a simple arrangement of parts, which is a great improvement on ordinary designs.

CAR BRAKE.—L. J. Smith, Hamilton, Ohio, and D. S. Knight, New York city.—This invention relates to a combined railroad car brake and starter, the device being so arranged that when the brake is applied the starter will be wound up, so that when the brake is again released the cars to which the device is applied will receive a start, thus overcoming the inertia of the car, whether the same is at rest or in motion.

MACHINE FOR BENDING RINGS.—Wm. H. Peckham, New York city.—This invention relates to a machine for bending metal bars into perfect and correct rings, of any suitable diameter, and it is particularly intended for jeweller's use, to form finger rings, bracelets, and other suitable articles, and may, if desired, be used with equal advantage for shrinking tires and other large and heavy rings.

LARD PRESS.—Solomon S. Avis, Pens Grove, N. J.—The object of this invention is to furnish a cheap, simple, and effective lard press for household use.

FLUID METER.—Charles E. Moore Elizabethport N. J.—This invention consists of a measuring cup affixed to a lever beam, properly weighted, by means of which the quantity of spirits filling the cup is both weighted and measured. The cup being filled is decanted automatically by its own weight, at which instant the spent pipe is cleansed by a proper mechanism, and the supply cut off until the cup returns to its first position, when the spirit is again permitted to flow. The trimmings of the lever are connected with suitable registering mechanism, and the whole apparatus contained in a locked case of sheet metal, having a dial plate in front for the registering pointers.

GATHERING TURPENTINE.—A. Pudigon, Charleston, S. C.—This invention relates more particularly to the gathering of crude turpentine from the pine tree, but may be employed for the collection of all resinous gums of a kindred character, which exude from wounds in trees.

MAKING ROOFING.—James H. Cole, Adrian, Mich.—This invention is designed as an improvement upon the device recently patented by Edmund Richardson and James H. Cole, for a process for making roofing and machines for the same, and consists in supporting the rolling instrument employed in said process, by an arm which reaches to and travels upon ways overhead, so that the operator can travel alongside of the instrument and direct the same.

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QUARTZ CRUSHER AND PULVERIZER.—Benj. Babbitt, New York city.—This invention relates to a device for crushing and pulverizing quartz, and it consists of a series of crushers arranged on the toggle principle, and provided at one end with elastic or yielding bearings, whereby the crushers are allowed to yield or give in case of coming in contact with any hard, foreign substance, such as spikes, or other metal articles, and the crushers prevented from being injured or broken thereby. The invention further consists in a novel construction of pressure rollers for pulverizing the crushed quartz, whereby the rollers are allowed to yield, or give, to admit of any hard foreign substance escaping between them without injuring the rollers or subjecting the same to any undue strain.

TOILET ATTACHMENT FOR BUREAUS.—Henry W. Eastman, Baltimore, Md.—This invention is a neat and ornamental attachment for bureaus which serves the purpose of a support for holding and adjusting the mirror, while it furnishes a convenient receptacle for combs, brushes, perfumery, etc., etc.

BALE TIE.—J. H. Gosch, Cheraw, S. C.—This invention relates to that class of bale ties in which the ends of the hoop are secured in a single slotted plate and consists in so forming the slots and tongues of the plate that the hoop can be more easily attached and fastened than by any other tie, and that when once fastened it cannot be untied, and will not be liable to fracture.

FRUIT AND GRAIN DRYER.—Solon L. Cheyney, Wooster, Ohio.—In this invention the fruit is dried in an oven by means of a current of hot air caused to flow over it from a heater beneath. The peculiar construction of the apparatus, by which the current is properly directed and its heat utilized to the fullest extent, constitutes the main feature of the invention.

DRAY SADDLE.—John O'Mahoney, Savannah, Ga.—This invention consists in a novel construction of the saddle whereby it may be made to conform to the shape of the back of the horse, and a very durable saddle of the kind specified obtained, and one which will not chafe or injure the horse in the least.

TIRE SHRINKER.—John Macy, Pine P. O., Oregon.—This invention relates to a device for shrinking tires, and it consists in the employment or use of a fixed bed provided with a fixed and an adjustable flange in connection with a fixed and an adjustable clamp, whereby tires of different widths may be contracted or shrunk with the greatest facility and in a perfect manner.

SCOOP AND SCREEN.—Augustus Thayer, Albany, N. Y.—This invention relates to a combined scoop and screen, whereby the device by a very simple adjustment may be used in either capacity, as desired.

HELIOMETER.—Conrad Friedrich L. Risch. Huntingburg, Ind.—This invention relates to an apparatus of very simple construction for observing and ascertaining the effects of the sun's rays upon the earth. By the use of this invention the exact degree of latitude at which an observation is made can be ascertained. Also by the aid of a suitable guide book, the date at which the observation is made, as well as the time of day, and the angle formed by the rays of the sun at noon of each day upon the level or water line.

FLEXIBLE GAS TUBING.—E. L. Perry, New York city.—This invention consists in outer flexible tubes of vulcanized rubber provided with one or more interior tubes of strong paper, the latter joined together by gum, glue, or other suitable substance which will make an impervious seam, the rubber tube being rolled up around the paper tube and the edges joined together in the usual manner, enveloping the said paper tube and serving as a protection to it, the latter being impervious to gas preventing the escape of the same.

DRYING APPARATUS.—F. I. Norton, Fremont, Ohio.—This invention consists in an arrangement of steam pipes within a suitable building, whereby the steam is conveyed around the interior of said building in any desired manner on the floor of the same by pipes, the said conveying pipes being provided with vertically projecting pipes having small orifices in their tops through which a very small jet of steam is allowed to escape, the hubs or other article to be dried being set on the said vertical pipes so that they discharge the steam into the holes through the same.

ANIMAL TRAP.—William J. Woodside, Zanesville, Ohio.—This invention has for its object to furnish an improved self-setting trap, simple in construction, not liable to get out of order, and effective in operation, instantly killing the animal that springs the trap.

SPRING BED BOTTOM.—Charles Walker, Chester, Vt.—This invention has for the object to furnish a neat, simple, durable, convenient and elastic bed bottom, and one which can be easily and quickly put up or taken down.

PAN FOR CONCENTRATING SULPHURIC ACID.—P. Marcelin and J. Saunders, Greenpoint, N. Y.—This invention consists in providing the pans with elongated, downward-extending spouts which reach from the upper part of that pan to which they are attached, to close above the bottom of the next pan below, so as to carry the lighter, impure contents of the upper pan to the bottom of the lower pan, and to thus create a complete circulation.

ROLLS FOR COTTON AND WOOLEN MACHINERY.—Francis Cragne and Geo. G. Cragne, Lewiston, Me.—This invention relates to an improvement in machinery for the manufacture of cotton and woolen goods, whereby an important saving in the expense is secured.

OSCILLATING OR VARIABLE ECCENTRIC MOTION.—Timothy Keeler and Geo. S. Avery, Danbury, Conn.—This invention relates to an improvement in applying the eccentric motion to various purposes, whereby the uses to which the eccentric motion is adapted are greatly increased.

FEATHER DUSTER.—M. A. Goodenough, New York city.—The object of this invention is to so construct a feather duster that the center of the brush shall be filled up with feathers of a less expensive quality than those used for the outside of the brush, and still make the brush elastic, more durable and useful than the ordinary kind.

FELLY DOWEL PIN.—O. D. Tyler, Gibson, Pa.—This invention relates to an improvement in dowel pins for fellies of wheels, and consists in forming it of a metal tube or thimble.

BASE OF ARTIFICIAL TEETH, ETC.—John A. McClelland, Louisville, Ky.—This invention relates to the composition and preparation of a new and improved material for the base of artificial teeth, and for other purposes in the arts.

ANIMAL POWER.—Jos. J. Adgate, Liberty, N. Y.—This invention relates to an improvement in machinery for utilizing the power of horses and other animals, whereby the same is more simple in construction and more effective in operation.

EXCAVATING VEHICLE.—James P. Smith, Cherry Hill, Pa.—This invention relates to a vehicle or self-loading wagon which may be used for excavating the earth in the process of grading, or in moving earth from one place to another.

DISINTEGRATOR FOR GOLD MINING PURPOSES.—Jerome B. Cox, San Francisco, Cal.—This invention relates to a method of separating gold from the cement or other material with which such metal may be combined.

MEDICAL COMPOUND.—John Bender, Lonaconing, Md.—This invention and discovery has reference to a composition formed of various ingredients known to the medical faculty, and which composition or compound is intended as a "tonic elixir," or cure for certain diseases, as dyspepsia and diseases of the stomach and bowels.

PLOW LANDSIDE.—Jerome Bacon, Medina, Wis.—This invention has reference to an improvement in plows, and especially to the manner of constructing the landside, whereby it is made adjustable and rendered much more durable than the ordinary kind.

DOUBLE-SHOVEL PLOW.—Andrew J. Craig, Ashmore, Ill.—This invention has for its object to furnish an improved double-shovel plow, so constructed as to be easily adjusted to run at a greater or less depth in the ground, or so that one plow may run deep while the other runs shallow, and to which the whiffletree or doubletree may be readily and quickly attached.

BRACE FOR CARRIAGE AND OTHER SPRINGS.—L. C. Miller, Humphrey, N. Y.—This invention has for its object to furnish an improved brace for springs for carriages, railroad cars, locomotives, spring seats, and wherever elliptic or half-elliptic springs are used, which shall be so constructed that it will hold the spring always perpendicular to the plane of the wagon, and which will protect the springs from any wrench or twist.

DISTILLING APPARATUS.—Jane Riley, Cincinnati, Ohio.—This invention relates to a new apparatus, to be put upon a still, for condensing and separating the various grades of spirits, and consists chiefly in such a construction of the condenser and water distributor that, without the use of a worm, and without requiring large quantities of water, the desired results may be quickly obtained.

PAN FOR CONCENTRATING SULPHURIC ACID.—Paul Marcelin and Joseph Saunders, Greenpoint, N. Y.—This invention relates to a new pan to be used in furnaces for concentrating sulphuric acid, and consists in arranging a partition across the pan, which reaches nearly to the bottom of the same, and which causes the lower settled portions of the acid to flow out of the pan.

CHANGEABLE COMBINATION LOCK.—Wm. D. Field, Providence, R. I.—This invention relates to a new changeable combination lock, which is so arranged that it can be applied to doors, and that it can be changed without inconvenience by simply removing the inner plate.

FOLDING BEDSTED OR CRIB.—R. S. Titcomb, Gloversville, N. Y.—This invention has for its object to improve the construction of the improved bedstead or crib, patented by the same inventor Dec. 17, 1867, so as to make it more strong, durable, and convenient.

PLOW.—Wm. Gallagher, Shullsburg, Wis.—This invention has for its object to furnish an improved sulky plow or plows, which shall be simple in construction, strong and durable, and which will do more and better work with a less outlay of power than any of the plows now in common use.

ANIMAL TRAP.—A. J. Adams and Boyd P. Quincy, Portland, Oregon.—This invention consists in providing the extremities of a circular or spring with hooks, and extending them apart by means of a device for mounting them as set.

WEEDING HOE.—Andrew Coleman, Red Bank, N. J.—This invention relates to a new and improved form for pointed weeding hoes, and consists in forming the plate for the hoe of corrugated sections, formed by striking up a pointed plate by means of dies, to the form shown, which is a succession of pointed arches, each having a V-shaped section.

MAGIC LANTERN.—L. J. Marcy, Newport, R. I.—This invention relates to the construction of the body or box of magic and signal lanterns, and consists of forming the same with an inner and outer shell with an air space between, whereby the body of the lantern may be made much smaller than were heretofore made, without becoming unduly heated. Other devices, perfecting the whole, render this an improvement on the magic lantern, as heretofore made.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

J. A. D., of Mo.—We know of no sure antidote for the sulphur of coal when used in iron working. It is said, however, that a solution of salt or salammoniac sprinkled on the coal before use, greatly mitigates the evil.

M. C., of Ga.—Soluble glass may be made by fusing ordinary glass with about one tenth of dry carbonate of soda. Both materials should be powdered and intimately mixed before putting them in the crucible. Soluble glass is an article of commerce and you can purchase it of excellent quality.

J. R. S., of N. Y.—Kane's Chemistry is right and you are wrong, for chloride of silver is soluble in ammonia. It dissolves more readily in cyanide of potassium and hyposulphite of soda. A good way to reduce the silver from the chloride is to place lumps of zinc in a thin paste of the chloride and water. The action is much more rapid when the paste is acidulated with sulphuric acid.

S. G. T., of O.—The source of carbolic acid is coal tar. The acid is separated from the distillate of the tar by means of treatment successively with caustic soda and sulphuric acid.

O. S., of N. Y.—There are great practical difficulties in the electro-deposition of iron and nickel, and no process is yet known which is satisfactory. Nickel is chiefly used as an ingredient of German silver.

S. S. C., of Ga.—You can get fine and rare chemicals of Luhme & Co., Lafayette Place, and of many other dealers in New York city.

P. S., of Minn.—Shellac dissolved in alcohol, with or without the admixture of lampblack, is the varnish used on wooden patterns.

E. E., of Ind., asks how to prevent the action of the sulphur contained in his forge coal on iron and steel in welding. The metal runs or drops before it gets to a welding heat. He ought not to attempt the welding of iron with "green" bituminous coal. If he cannot procure charcoal he should coke his coal before using it for this purpose.

E. G. P., of Iowa.—The question who was the original discoverer of chloroform or chloric ether as an anæsthetic has been sufficiently discussed. The subject is dead.

M. P. P., of Mass.—That your tin can when filled with steam and suddenly collapsing by injecting cold water, assumed a hexagonal shape, was simply because in six places the tin happened to be strongest; when you repeat the experiment with tin cans made of various samples of tin you surely will collapse them to a great variety of shapes. It has nothing to do with the hexagonal shape of the snow crystals, which are thus simply because water belongs to a certain system of crystallization; why it does belong to this system and to no other we know about as much as why sulphur is yellow and vermillion red; recent researches, however, indicate that the form of crystallization is intimately connected with the chemical composition or the arrangement and attractive power of the atoms of a body.

R. A. M., of Conn.—The present method of hardening the surface of malleable iron is to make the object red hot, then strew equally on the surface powdered ferrocyanide of potassium (yellow prussiate of potash) and plunge it quickly in cold water. The old method is to take horn, hair, dried blood, salammoniac, or other nitrogenized substances, and pack them with the objects to be hardened in a sheet-iron case or box make this box with contents red hot, open it then quickly and throw all in cold water. This is the genuine original case hardening, but has now been abandoned for the use of the ferrocyanide which is manufactured from the above-mentioned nitrogenized substances. The paragraph page 231, relative to converting cast iron into steel, needs correction. Cast iron has an excess of carbon and is converted into steel by the Bessemer processwhich robs it of a part of this carbon, by blowing air through it, from which it probably also absorbs some nitrogen in its stead. Puddling robs cast iron of all carbon and transforms it into malleable iron.

James Duncan, of Pioneer City, Idaho, is a miner and is willing to pay five hundred dollars for a recipe which will enable him to get the gold out of sulphurets, a specimen of which he sends us, without roasting, etc. It seems to us that this is not a case where recipes will prove useful unless to extract V's from our correspondents' pocket.

G. T., of Pa.—"Is there any metal composition similar in nature to brass, but cheaper, color immaterial?" Common type metal is hard but not tough. Copper, zinc, and lead will make an alloy suitable to your demands, but as copper is costly you must obtain the quality of cheapness by using less of it and more of the others. A few trials will give you the right proportions.

H. W., of Pa.—"The best composition for strengthening the fiber of wood, making it more difficult to split." Kyanized wood is tough, and wood impregnated with copperas becomes harder and more indestructible.

I. B. F., of R. I., is not satisfied with our simple "yes," given page 247, on his question if "in a common pump the water is raised by the muscular force of the operator." He thinks this does not agree with the teachings of the philosophical books who say that it is raised by the pressure of the atmosphere; to this we also answer, yes; but in order to give the atmosphere standing on the surface of the water in the well an opportunity to press the water upward in the tube, the muscular force of the operator must by means of upliting the piston remove the pressure of the atmosphere on the water inside the tube, therefore it is directly the atmosphere which lifts the water but, of course, indirectly the muscular exertion of the operator, who destroys the equilibrium in the atmospheric pressure outside and inside the tube by applying a lifting power equal to the weight of the column of water under the piston.

Dr. W. F. Q., of Del.—Your theory of the agency of electricity in attracting or repelling atoms of matter is not new, but neither your paper nor the treatises of others who have written on the subject furnish proof of the theory or solve the problem.

A. G. B., of Ind., wishes the opinions of practical carriage makers and users as to the proper diameter of axles for light vehicles running over sandy or muddy roads. Some say the smaller the arm the less the friction; others, the contrary.

W., of N. Y., asks the components of axle grease. Water, 1 gal.; tallow, 3 lbs.; palm oil, 6 lbs.; soda, ½ lb. Heat to 210 Fah., and stir until cool. Tallow, 8 lbs.; palm oil, 10 lbs., and plumbago, 1 lb., make a good lubricator for wagon axles.

S. P. H., of L. I.—This correspondent asks for a description of the process of galvanizing iron. We believe we have answered a similar question before, but as we have had lately several applications for the information we will reply again. Sheet iron, when cleansed by means of sulphuric or hydrochloric acid diluted with water, may be dipped in a bath of melted zinc covered with powdered salammoniac, when a thin film of zinc will adhere to the surface. A better and more effectual way is to employ a melted amalgam of 202 parts by weight of mercury and 1·3 of zinc. The iron should be cleaned as before.

C. W., of Ohio.—Partly worn files may be renewed in a degree by standing the files, tang down, in a jar of dilute nitric and sulphuric acid, letting them stand over night.

E. G. P., of Iowa, says that Dr. Samuel Guthrie, of Sackett's Harbor, N. Y., manufactured percussion powder in pill form as early as 1818, and it was used to some extent in the navy for firing cannon. We are aware that Dr. Guthrie's experiments are recorded in the *American Journal of Science* for January, 1832, but Rev. Mr. Forsyth, in 1807, patented a fulminating powder composed of chlorate of potash, sulphur, and charcoal.

B. F. W., of N. Y.—"Why cannot the electric light be used for street lamps and locomotive head lights?" We know of no reason why it may not be adapted to the lighting of streets, but the motion and jar of a locomotive would seem to be an almost insuperable obstacle to its adoption for railway trains.

W. H. P., of Iowa, referring to our reply to "E. O. McC.," on page 231, current volume, says: "It is well known that friction will induce magnetism in steel rods or bars when they are in a position at right angles to the west and east current of electricity. Of course, when upright, they are at right angles with such current, and also when in a horizontal position north and south. When horizontal, east and west, friction will not produce magnetism.

Business and Personal.

The charge for insertion under this head is one dollar a line.

Patent for sale—the most improved egg beater yet invented. Address the inventor, Wm. N. Angus, Morristown, N. J.

For sale—shop and four lathes for manufacturing spools and pill boxes. Terms easy. M. H. Brown, Potsdam, N. Y.

Wanted—parties to manufacture a small article made of wood and wire. Address M. N. Lovell, 84 East 8th st., Erie, Pa.

Manufacturers of bells suitable for mounting on farm houses would do well to send cuts and price list to Fred Hertel, Baraboo, Wis.

Olmsted's oilers are the best. Sold everywhere.

For Sale—Eight new portable steam engines, thirty horse-power each, of superior construction. Address Poole & Hunt, Baltimore.

First class lock makers wanted. Address Jones & Nimick Manufacturing Co., Pittsburgh, Pa.

Paper-collar machines and linen bosom, collar, and cuff-plaiting machines, upon improved principles, at W. H. Tolhurst's, cor. Union and Fulton sts., Troy, N. Y.

E. F. Mallory, West Springfield, Pa., wishes to contract for the manufacturing of a quantity of his Patent Burglar Alarms. Anybody can make them. Sample, by mail, $1.

Globe valves, oil cups, and for all kinds of water, gas, and steam goods, address Baily Farrell & Co., Pittsburgh, Pa.

For Improved Lathe Dogs and Machinists' Clamps, address for Circular, C. W. Le Count, South Norwalk, Conn.

Brick Machine.—Lafler's New Iron Clad has more advantages than any other ever invented. For descriptive circular address J. A. Lafler & Co., Albion, Orleans county, N. Y.

Make your patents pay!—J. H. White, Newark, N. J., will make to order, and introduce to the trade, all descriptions of metal small wares, small machines, etc., etc. Also furnish dies and tools for all kinds of metal work.

For improved double and single-roll carding machines, seven roll rubbers, twisters, card grinders, etc., address Union Iron Works, Rhinebeck, N. Y.

Spring-bed bottom—cheapest and best in use. Responsible Agents wanted in each State. Address S. C. Jennings, Wautoma, Wis.

One half of patent right of Wyatt's mode of reefing top gallant sails given for obtaining patent in England. Geo. Hart, New Bedford, Mass.

Mill-stone dressing diamond machine, simple, effective, and durable. Also, Glaziers' diamonds, and for all mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

Paper Makers, Tanners, etc., wanting the Best and Cheapest Pump in use will send for Circular to Heald, Sisco & Co., at Baldwinsville N. Y. Agents wanted.

Tube Well—Best in Use.—Patented in 1865. State, County, and Town Rights for sale. Send for circular and prices. Address Dutton & Maguire, Port Jervis, N. Y.

Merriman's patent bolt cutters—best in use. Address, for circulars, etc., H. B. Brown & Co., New Haven, Conn.

Bartlett's machine and needle depot, 569 Broadway, New York. Needles for all machines. Hackle, Gill Pins, etc.

Engineering facts and figures for 1867, mailed on receipt of $3. John Penington & Son, 127 S. 7th st., Philadelphia, Pa.

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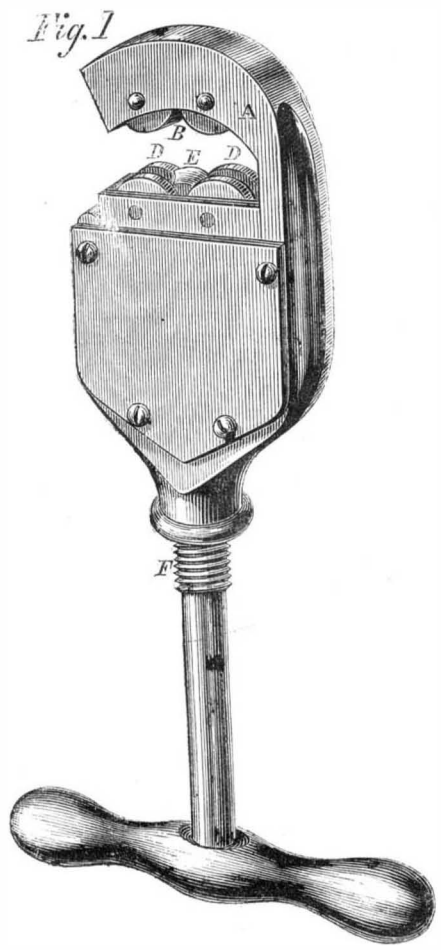
DE GALLEFORD'S IMPROVED PIPE CUTTER.

Tools for hand cutting tubes and pipes have been for some years in use, but whatever their conveniences, each one has had some objectionable feature, one of the commonest of which is the rigidity of position of the cutter, whether rotary or fixed, which would not give to any inequality on the pipe and must be forced through all obstructions. This objection, probably more than all others combined, has delayed and obstructed the general introduction of hand tube cutters,



most workmen preferring the lathe, or even the vise and file or saw, to the uncertain results of the hand cutting tool.

Fig. 1 of the engravings shows a perspective view of a tool on which a patent was issued through the Scientific American Patent Agency April 14, 1868, to J. De Galleford and Wm. E. Marston. Fig. 2 is a section showing the principal working parts. The stock, A, curved or C-shaped, contains two friction rolls, B, on fixed axes, seated in a recess, C, Fig. 2 being the tube or pipe to be cut. In the lower part of the stock is a movable block, the upper part of which holds two other friction rolls, D, which, in connection with the rolls, B, retain the pipe in place, while the cutter, E, performs its work, it being fed against the pipe by the screw F, into which it is seated and by which it is guided as seen in Fig. 2.

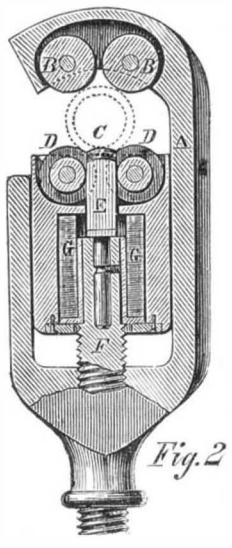


Fig. 2

The principal improvement, however, designed by the inventor, is the yielding of the cutter to obstructions offered by the irregularities in the surface of the pipe to be cut. In this device the cutter and the rolls, D, are sustained on a rubber tube or spring, G, seen in section in Fig. 2. A pressure of 150 pounds is required to compel this rubber tube to yield, which is sufficient to hold the cutter to its work, while not allowing it to be destroyed or even injured by the obstructions offered by inequalities of the surface of the pipe.

For further information address Wm. E. Marston, manufacturer, 326 River street, Troy, or John De Galleford, Box 478, Cohoes, N. Y.

Hardening Iron and Steel.

Francis E. Sessions, of Worcester, Mass., has recently obtained as above.

The article made of iron or steel, to be carbonized or hardened, is immersed in a bath of molten cast iron and allowed to remain the desired length of time, after which it is removed and thrown into cold water. It is found that the melted cast iron, or bath of molten cast iron, works the best when heated to the degree required by founders for pouring good castings, and when thick or large pieces are to be carbonized or hardened, it may be well to raise the heat of the molten metal still higher. The depth at which the metal will be carbonized and hardened will depend much upon the length of time it is allowed to remain in the molten bath of cast iron, and also somewhat upon the degree of heat to which the melted metal is raised, so that each operator can, by a few trials obtain almost any desired depth or carbonization or hardness, whether operating upon iron or steel. The bar or article, if instantly withdrawn from the molten bath, as soon as immersed, and plunged or thrown into cold water, will be carbonized or hardened to a slight depth, and which, in case of thin bars or articles made from thin sheets of iron or steel, may be all-sufficient.

It is unnecessary to recapitulate and enumerate the advantages of my invention, since all, and especially workers in metal will readily appreciate the value and extent to which my invention may be applied successfully. Articles made from iron can be carbonized and hardened at a slight expense, so as to have a surface equal in resistance and hardness to the best tempered steel, while at the same time having an elasticity, owing to the malleability and toughness of the central parts, which prevent the breaking or cracking of the articles.

New Mode of Printing and Embossing Cloth.

Hitherto the art of printing and embossing figures and designs on fabrics has demanded consecutive or separate operations. The ordinary stencil is often employed, and the figures or patterns filled in afterwards. The colors have been piled up or laid on thickly, so as to project the figures and present the appearance of raised work. This mode is defective, since the colors are brittle and liable to crack, and every time the figure comes in contact with any object a portion thereof is broken off, and soon the ornamentation is destroyed and the fabric laid bare again.

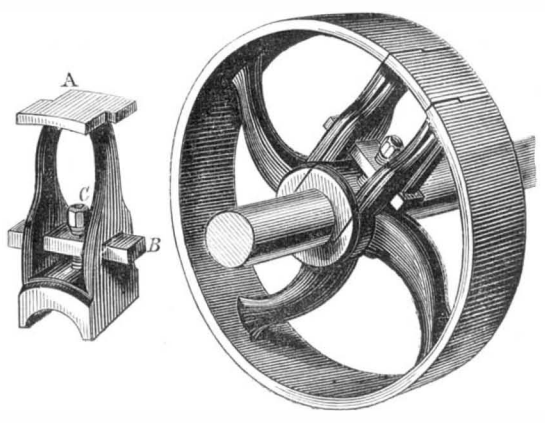
In carrying out this invention, first engrave an ordinary brass plate with sunk or depressed figures, such as flowers, fruit, animals, or whatever designs or representations desired, and charge or feed them throughout with various colors, according to taste. This plate is applied directly to the top of the cloth or fabric, the colors being in a wet state. An iron plate is then heated to a certain degree, and laid on the top or back of the engraved plate, and the whole is placed under a press. The hot iron plate being applied to the engraved plate, the heat will slowly be diffused through the latter plate while the cloth and the two plates are under pressure.

The color is gradually absorbed by the fabric as it enters or is forced into the depressions or engraved portions of the plate, and then it dries with a uniform and elastic finish; and so perfect is the drying that each ornamentation appears to be homogeneous from the surface to the back of the fabric, and therefore the parts thus ornamented present the appearance of fine velvet, or ordinary worsted, embroidered, or raised work. This invention can be applied to any fabric, and in the ornamentation of table covers, piano covers, skirts, slippers, ladies' cloaks, and the like.

Recently patented by Lewis Murr, of Philadelphia, Pa.

WHEELER'S ADJUSTABLE PULLEY FOR ATTACHING TO SHAFTS IN PLACE.

The annoyance of taking down a section of shafting, driving out keys, and removing couplings, merely to slip on a pulley needed for some machine added to the *materiel* of a concern, requires time and necessitates trouble. Frequently, also, it is found that when keyed back the couplings do not assume their former position exactly, and when the faces of the halves are brought together they throw the shafting out of line. Pulleys intended to be placed on a shaft without this trouble are usually cast in halves, and it is notorious that those so made are generally unreliable and troublesome to fit. First, it is difficult to cast them; secondly, they are difficult to turn; and, third, when put on the shaft they seldom run true.



The plan shown in the engraving appears to be the most feasible and reasonable of any we have yet seen. Every practical man must see its advantages at once. One or more of the arms of the pulley is enlarged, or divided, admitting a piece shown at A, a casting separate from the pulley, and easily fitted to the latter by the file. This supplementary piece has a section of the hub embracing one half of the shaft. It engages with the rim of the pulley by a parallel cut, divided in the center at right angles. This form of division, however, is not material. The piece is held in place by a bar, B, passing through the true arms of the pulley and the false arms of the segment and held in place securely by a set screw, C. Instead of this arrangement the bar may be a single key without set screw. Every machinist and millwright will see, at once, the advantages of this simple device for adjustable pulleys. There is no set screw to mar the shaft and no key in the hub of the pulley or key way on the shaft to be cut. Most of the fitting required is at the rim, as the hub portion may be cast accurately enough and the key may be forged to fit.

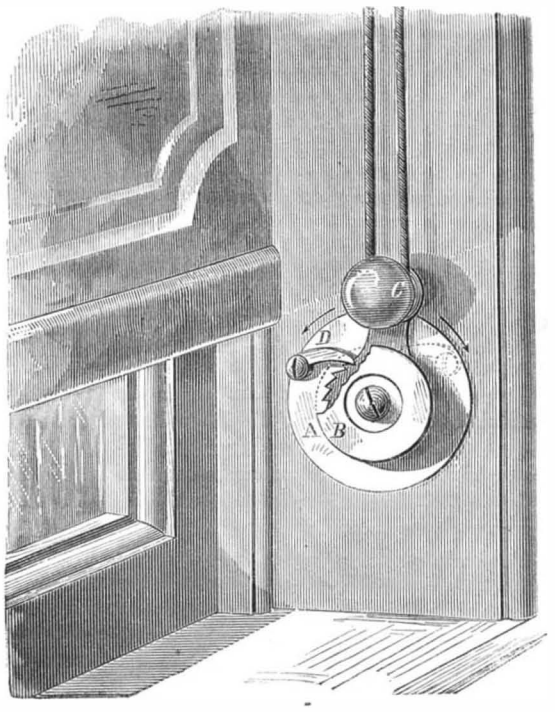
Patented April 24, 1868, by Seth Wheeler, who may be addressed at Albany, N. Y.

Baldwin's Automatic Lathe.

On page 268, Vol. XVI., we gave an illustration and description of Baldwin's automatic lathe for turning ornamental wood work and pieces of unequal diameter. Its simplicity and compactness, with its uniformity of work recommended the machine to us at that time, although our ideas were drawn wholly from a model, a miniature machine. A few days ago, however, we examined one of a size calculated to turn work of from one and a half inches diameter down to the size of a pen holder and even smaller. It may be seen in operation at No. 65 Liberty street, New York city, and we recommend practical mechanics and others interested in this class of work to witness its operation. In length and variety of work it has scarcely any limit, a single machine being capable of turning a fishing rod forty feet long and the most elaborate patterns for architectural, furniture, or cabinet ornamentation. The marvelous rapidity of its action and the exactness of the work performed would hardly be credited except by actually witnessing its operation.

CURLEY'S PATENT ADJUSTABLE CURTAIN FIXTURE.

The neatness and simplicity of the little device shown in the engraving are among its desirable features. It is, as seen, a holder for the cord by which the curtain is raised and lowered, and is attached to the casing of the window frame. There



is a circular base plate, A, and an outer and smaller plate, B, between which is the lever, C, the whole held together and to the wood work by a single central screw. The lever, C, has a pulley for the reception of the cord, and its central portion is cut into a right and left hand ratchet with which the pawl, D, engages. This is for tightening the cord when loose, by depressing the handle of C. The pawl may be used on either side, the right or left, simply by taking out its screw, turning the base plate half way round, and replacing the screw. Having tested it in practice we consider it a very convenient and useful device.

This device was patented through the Scientific American Patent Agency, March 24, 1868, by Thomas Curley, who may be addressed relative thereto at Troy, N. Y.

Magnetic Figures with Iron Filings.

These iron filing magnetic figures are, and, as we believe, have always been, of scientific use. For example, in magnetizing steel bars for permanent magnets, in what other way are we to detect faulty bars. Though the steel may be selected with the greatest care, and very carefully hardened and tempered, and they may appear to be perfectly similar, yet on being magnetized it is probable that not more than 30 per cent will be good; at least, we have always found it so. If the fault be in defective tempering that is easily rectified, but if it be through internal flaws, iron filings only will detect these. Let the bar be magnetized and covered with a stout sheet of paper on to which sift iron filings, and if they arrange themselves round several vacant points along the bar it may be concluded that under these there is an internal flaw, and in all cases it will be found to be so on breaking the bar; such a bar is of no use for a magnet. The cracks in the bar divide it into a series of small magnets.

This is the use that these figures have been put to for many years—at least, we have used them for this purpos, and no doubt others have done the same; but latterly the principle has been put to a most valuable use in a manufacturing and engineering point of view. It has been applied to testing the soundness of manufactured iron, for the detection of internal flaws and unsound welds. For the testing of chain cables and anchors it will be invaluable, so much property and so many lives depending on their soundness. Though these may look sound and perfect externally, they may have internal flaws which will surely cause them to give way when the stress comes upon them. For testing chains and anchors experimentally, it has already been applied, and doubtless it will be soon brought into universal practice, and also for testing the material of which bridges are to be made, and also railway wheels and tweers, and, in fact, manufactured iron of every kind which is required to resist great strains or shocks.—*Mechanics' Magazine.*

PISCICULTURE.—A gentleman in Mumford, N. Y., extensively engaged in trout breeding, lately intrusted to the mercies of the postal service a package of trout spawn for transportation to the far-off land of Dakotah. A letter has just been received informing him that out of two hundred spawn sent, all but six hatched out in a breeding trough and the fish are doing well.

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VOL. XVIII., No. 20....[NEW SERIES.].. *Twenty-third Year.*

NEW YORK, SATURDAY, MAY 18, 1868.

Contents:

(Illustrated articles are marked with an asterisk.)

Rationale of the Therapeutic Action of Arsenic in Diseases of the Skin..... 305
*Improvement in Portable Reciprocating Sawing Machines.... 305
*Patent Self-Acting Steam Valve.. 305
Influence of Anæsthetics on Brain and Nervous System..... 305
Alloys—Review of a Lecture by Dr. A. Matthiesen, F.R.S..... 306
The Watch—Its History and Manufacture..... 306
Do We See the Sun as Soon as it Rises?—Aberration of Light.. 307
Velocity *vs.* Power—The Valve of the Indicator..... 307
Cutting Mirrors..... 307
Electro-Magnetism as a Motive Power..... 308
Casting Metal in Plaster Molds.... 308
Water Rams..... 308
Screw Threads—Honor to Whom Honor is Due..... 308
Why Is It?—Water *vs.* Beer..... 308
Editorial Summary..... 308
American Institute Polytechnic Club..... 309
*Improvement in Self-Acting Car Couplings..... 309
Controlling Water Currents—Deepening the Channels of Rivers.. 309
Primitive Climate of the Earth.... 309
The Woodpecker's Foresight..... 309
Coloring of Zinc Plates..... 309
Trial and Loss of a Self-Propelling Vessel..... 310
Earth Circuit in Telegraphy..... 310
Mirrors Without Mercury..... 310
Insect Fabricators of Iron..... 310
Manufacturing, Mining, and Railroad Items..... 310
Recent American and Foreign Patents..... 310
Answers to Correspondents..... 311
*De Galleford's Improved Pipe Cutter..... 312
Hardening Iron and Steel..... 312
New Mode of Printing and Embossing Cloth..... 312
*Wheeler's Adjustable Pulley for Attaching to Shafts in Place... 312
Baldwin's Automatic Lathe..... 312
*Curley's Patent Adjustable Curtain Fixture..... 312
Magnetic Figures with Iron Filings..... 312
Aluminum—A Field for Scientific Effort..... 313
The Value and Uses of Worn-out Files..... 313
Importance of Studying Cause and Effect—A Hint to Inventors... 313
Great Reduction in Cost of Foreign Patents..... 313
Etching Glass—One of the Uses of Fluor Spar..... 313
"The Wheel"..... 313
To All Whom It May Concern.... 314
East and West..... 314
Taxation..... 314
Patent Office Decision..... 314
Spiritualism in the London Polytechnic Institute..... 314
Solid Back Brushes..... 314
Patent Claims....314, 315, 316, 317, 318
Pending Applications for Reissues 318
Extension Notices..... 318
New Publications..... 318

ALUMINUM---A FIELD FOR SCIENTIFIC EFFORT.

The comparatively new metal, aluminum and its alloys, which have lately attracted considerable attention and awakened some curiosity, seem to afford a promising field for the investigations and experiments of scientific men and inventors. It is singular that since its discovery, as a metallic oxide existing in aluminous earths, no cheap and rapid method of extracting it has been discovered. All clays contain it, some in a less pure state than others, but all in large proportions; in fact it forms the basis of clay. It might be supposed that chemical science, aided by mechanical ingenuity, might, before this, have found a means of producing this metal in unlimited quantities and at a low cost. The process, however, of its extraction is somewhat complicated and quite expensive. Its cost, at present, confines its use to small articles and the purposes of ornamentation. Some of its alloys make it a substitute for silver and gold, to the former of which it is superior in several respects. It is not affected by air containing sulphur; pure, it is whiter than silver and is capable of as high a polish; it is very ductile and malleable, and its tenacity is wonderful. But, perhaps, its most remarkakle quality is its elasticity. When wrought by the hammer rollers, or in any other manner, and fashioned into a hollow vessel it will withstand violent blows which would permanently indent other metals.

Cryolite a species of clay found abundantly in Greenland and also in the Ural, is preferred as a material for the extraction of alumina. It is a compound of sodium, fluorine, and aluminum. In its color it is snow white. It is not unjustly called native fluoride of aluminum, and contains thirteen per cent of metallic aluminum. Fluor spar is frequently employed in combination with cryolite, for the purposes of reduction, because of its value as a flux. The emerald, the topaz, and some other valuable stones contain a large per centage of aluminum or aluminous oxide, and the metal, aluminum has been extracted from the emerald, ruby, garnet, topaz and from corundum. Of course such scientific experiments are costly, and cannot, in themselves be of immediate practical advantage; yet it would seem that so valuable a metal as aluminum distributed (in the form of an oxide) more generally and plentifully over the globe than iron is, might be procured with no greater expenditure of labor, time, and money than iron. The fact of its being presented only in the form of an oxide need not militate against its reduction from its matrix in a metallic form. Some of the best of iron—that cheapest, but most valuable of metals—is produced from its oxide. To be sure, we cannot apply the same crude means to the reduction of aluminum from its base, mother clay, that we can use in the reduction of iron; and this is just where scientific knowledge and practical talent is needed. We want the metal; the exigences of the times demand its general use. It will readily combine with other metals, as copper iron, gold, etc., and with them forms very valuable alloys. With iron three parts, and aluminum one part, the composition will not oxidize when exposed to moisture; with copper, ninety, and aluminum ten, a beautiful metal is produced, harder than the best bronze, whiter than copper and capable of being wrought under the hammer. One part of aluminum, to one hundred parts of gold, gives a fine greenish gold color, more agreeable to the eye than that of gold, and much harder. Some of these qualities seem to recommend this metal or its alloys as a material for minting, and others stamp it as of vast value in the arts.

What we now need is its production in sufficient quantities and cheap enough to be employed in the arts.

THE VALUE AND USES OF WORN-OUT FILES.

Although the invention and use of machines for finishing work in metals has, to a large extent, superseded the employment of files, it is difficult to believe the day will ever come when the file will cease to be an important tool to the metal worker. We have planing machines, shaping machines, milling machines, and their adaptations, which do a large proportion of the work formerly performed through the medium of the cold chisel and file, directed by the expertness and skill gained by long experience; but still the file is one of the most necessary and valuable tools of the machine shop. Numerous attempts have been made to cut files by machinery, and we understand some of the later have been successful, but have had no opportunity to test the correctness of the statement. Generally, however, files are cut entirely by hand, and the skill required in their production affords one of the most beautiful illustrations of the capacity of the workman to reproduce indefinitely the results of acquired experience.

But "what shall I do with my worn-out files? shall I have them re-cut? will it pay?" asks one of our correspondents. During an experience of fifteen years we had many opportunities to solve this question. Over and over again we sent our old, unbroken, files to be recut, with the assurance, each time, that they would last nearly as long as new, but each trial confirmed the conviction that it was all "vexation of spirit." If there is any annoyance more aggravating to the machinist than another, it is a file that fails him when engaged on a nice job. It requires some little time for the hand of the workman to become habituated to a new file, and to have it break or refuse to cut just when his whole mind is intent upon his work, is very vexatious. We never yet used a re-cut file with any satisfaction. If one can be re-cut to give good after service, it must be a heavy finishing file, the teeth of which are fine, and the stock of which is sufficient to withstand the manipulation necessary to reproduce it. We have little faith in re-cut files; they are tender, apt to break, quickly worn, and altogether unprofitable.

Yet old files have a use. They make excellent hand turning tools. For this purpose the end merely has to be ground to the proper shape. Probably to the hand-tool turner no implement is susceptible of a greater variety of adaptations than a turning tool made from a triangular or three-cornered file, while the flat files make superior chisels for finishing plain work, and the square file becomes both a roughing and finishing tool. Old files make good scrapers. For this purpose they must, sometimes, be partially forged, enough to turn their ends at an angle to the file. In this case—and in all others where files are subjected to the action of the hammer—the portion to be forged should be ground until every mark of the teeth is obliterated. No matter how careful the heating and the hammering, if a vestige of the teeth is left the result will be a weak place, a "cold shut," or a crack in the tool. It is useless to attempt to forge a good tool, as a cold chisel or turning tool, from an old file, unless the teeth of the file and their marks are all obliterated by the grindstone; the indentations seem to enlarge and expand by the heat and show themselves in serious fractures at the most inappropriate time.

Treated in this way, old files may be wrought into dies for screw cutting, punches, small cold chisels, keys, and many other articles and appliances continually needed in the shop. The work of grinding can employ the leisure hours of apprentices, and if judiciously performed, it will, at the same time, tend to true the face of the grindstone. Any of these ways of utilizing old files we believe to be preferable to the mistaken economy of paying for their re-cutting and worrying over their unsatisfactory after performance.

IMPORTANCE OF STUDYING CAUSE AND EFFECT.---A HINT TO INVENTORS.

A very large proportion of the time, labor, and money usually spent in perfecting new inventions is often needlessly expended in the trial of experiments to determine facts which should be determined without any experiment at all. We have in mind two remarkable instances of this kind, which have come under our own observation. One was the attempted construction of an air gas light machine, in which the object to be attained was the supplying of the material (gasoline) to a reservoir in which revolved a device for charging the air with the vapor of the fluid. The condition to be observed was, that a given level of the fluid in the reservoir was to be maintained. To do this a second reservoir of the fluid was placed over the first, communicating with it by means of a tube passing from the lower part of the upper reservoir, and opening into the lower reservoir at the precise point at which the level was to be maintained. The upper reservoir was filled at the top, the communication between the two chambers being meanwhile interrupted by a stopcock, and when filled, securely seated by a stopper screwed down upon a washer of leather. It was expected that this arrangement would operate as follows: When the fluid in the lower chamber was exhausted, so as to uncover the mouth of the tube, a bubble of air would pass into it, and rising to the upper reservoir, displace a small portion of the fluid, and this operation repeated would produce the required result.

Now had the fluid been glycerin, or sperm oil, or any other non-volatile substance, the result anticipated would have been attained; but the gasoline volatilized so rapidly in warm weather, that the fluid was forced entirely out of the upper reservoir when the stopcock in the tube was left open, a result which should have been foreseen, and which was predicted by us before the apparatus was set in operation.

Even at this stage the radical fault of the device was not discovered, but the inventor strove to overcome the difficulty by the use of siphons, tubes bent in the form of the letter S, etc.

The faults of this inventor are not, we are sorry to say, rare ones. They were his imperfect knowledge of the material with which he had to deal, and his tinkering when he should have been thinking, and searching for the information which he lacked. How much time and money have been thus wasted upon the futile attempt to construct the so-called perpetual motion! And have we not heard somewhere of a man who was to revolutionize ideas of motive power by pumping water with a diminutive steam engine upon a gigantic overshot wheel? Yes, we have not only heard of that individual, but have seen him expending his money, regardless of the warnings of those who saw and realized his folly, until a reasonable competence, which he had accumulated through a steady and industrious life, had melted away, and left him a poverty-stricken and disappointed old age. This individual is by no means a natural fool. He is capable of attaining and applying knowledge. He failed in that he substituted tinkering for thinking, and supposed himself competent to force nature to yield him obedience, without a knowledge of her mysteries. The folly of this man forms the second instance of useless and vain experiment above alluded to.

He only need expect to avoid such follies who thoroughly informs himself in regard to what has been done in the particular department to which his proposed improvement belongs; who can distinguish principles, and avoid confounding them with mechanical details; and who has mastered the philosophy of all the natural phenomena with which he has to deal. To such a man, speedy and sure success will be the reward of his efforts, or the speedy and not valueless knowledge that success is, from the nature of the case, impossible.

GREAT REDUCTION IN COST OF FOREIGN PATENTS.

The increasing disposition on the part of American inventors to secure their inventions abroad, has induced us to reduce our fees for obtaining patents in all foreign countries to the lowest maximum price. Hereafter we shall solicit patents in England, France, Belgium, Prussia, Austria, Spain, Cuba, Russia, Saxony, Norway and Sweden, Australia, and in every other country which has patent laws, at greatly reduced prices, making our terms most favorable to the inventor. We have agencies established among the oldest and most reliable foreign solicitors, with some of whom we have had business relations for nearly a quarter of a century.

It is important to the owners, that patents in foreign countries be solicited through some old established and well known agency. We have known parties to meet with great discouragement in trying to introduce their inventions in England, from the fact that the patent was solicited through obscure agents unknown to the manufacturers. The English people are very peculiar in this respect, and on the continent the same prejudice exists against patents not obtained through well established houses.

We have in press, which will be issued in June, a comprehensive work on the patent laws of all countries. A pamphlet on foreign patents with terms for obtaining them, may be had by addressing this office.

ETCHING GLASS---ONE OF THE USES OF FLUOR SPAR.

The mineral known as fluor spar or Derbyshire spar from Castleton, Derbyshire, England, where it is found in large quantities, is largely employed in the form of fluorine or hydrofluoric acid, for the ornamental etching of glass. The acid is obtained by heating the fluor spar, coarsely pounded, with sulphuric acid in a leaden vessel; glass will not do, as the acid acts powerfully on that substance. Glass to be operated upon is coated with beeswax, or a resisting substance of which beeswax is the principal component. By means of a pointed instrument, as a needle, the design is sketched so as to expose the glass where the lines have been made. A mixture of spar and sulphuric acid is placed in a leaden tray and the glass with the side on which the design is sketched suspended over the mixture, when a gentle heat, as that from a spirit lamp, is applied to the under side of the tray. The vapor of the combined acid and mineral rises and attacks the glass, producing in a short time the design with as much delicacy and distinctness as could be done with the glass cutter's wheel. If desired, the figures or tracery may be left bright and the ground etched, simply by sketching with a camel's hair pencil, dipped in melted wax, the pattern or design on the glass. The effect is very fine.

This mineral is quite extensively manufactured into articles of use and ornament, it being readily wrought in the lathe by skilled workmen. Very handsome specimens of cups, vases, boxes, etc., are produced from the Derbyshire spar, which is frequently found of a rich blue, green, red, or purple color. The pure white variety is found in large quantities in Hardin county, Ill., and in other localities in this country, the colored specimens are quite plentiful.

"THE WHEEL."

Our readers are aware that we design shortly to print, under the title of "THE WHEEL," such new or surplus correspondence on the Wheel-question as the writers desire to place in print at their own expense. The new publication will be issued May 15th, in handsome magazine style, price 25 cents. In addition to the above correspondence, "THE WHEEL" will contain a large amount of other valuable scientific matter. For example, among its contents will be found the whole of the recent splendid series of lectures by Prof. John Tyndall, upon "HEAT AND COLD," profusely illustrated. These lectures are replete with rare and instructive information, given in most attractive style. To lovers of

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interesting scientific truth they will be worth ten times the price of the book. All orders for "THE WHEEL" should be addressed to MUNN & Co., 37 Park Row, New York.

TO ALL WHOM IT MAY CONCERN.

MESSRS MUNN & Co.:
37 Park Row, New York.

GENTLEMEN:—Whereas you have been in the habit of publishing in the SCIENTIFIC AMERICAN notices of pending applications for the reissue of Letters Patent; and whereas such publication has been declared to be illegal by Mr. Justice Fisher; and whereas we have lately filed in the Patent Office an application for the reissue of a patent owned by us; now you are hereby notified that in case you shall publish notice of our said application or the claims which we have made in the specifications accompanying the same, we shall hold you responsible for all damages that may accrue to us by reason of such publication, whether by delay in the grant of our application, or by the expense to which we may be put in prosecuting our application.

THE GROVER & BAKER SEWING MACHINE Co.,
By their Attorney,
E. S. RENWICK.

34 Beach St., New York, April 29th, 1868.

What is up now? Is there a Sewing Machine Company endeavoring to get a reïssue of a patent to cover claims which they are ashamed to have the public scrutinize? or what is the matter?

On reading the first lines of the above letter we thought it a hoax, but on approaching the end our eye caught the signature to the document, and we could no longer believe the portentious threat a joke. The public will look with more than ordinary interest for the claims which the parties would restrict us from publishing. We expect some dire misfortune awaits us for not obeying "The Grover and Baker Sewing Machine Company. by their attorney, E. S. Renwick's" injunction; but the curiosity of our readers must be gratified, and we abide the result for our temerity.

P. S.—Up to the time of going to press we had not received any notice from the Patent Office which we identify as coming within the above injunction. We are looking with impatience, however, to see what it is that calls forth a letter of such threatening import.

East and West.

When we look east or west, our line of vision is of course at right angles to the meridian, and in a plane, which, being vertical, passes through the center of the earth. At the equator, this plane of east and west vision coincides with the latitude, that is, with the plane of the equator, and all countries actually east or west are in the direction which the eye takes in looking east or west. But in all other places the plane of vision deviates from the plane of the latitude, and people who think that the places set down on the map as east or west of them are actually in the direction that they are accustomed to call east and west, are generally very much deceived. The plane of latitude cuts off a slice of the earth, larger or smaller, according to its distance from the equator, north or south; but the plane of east and west vision, passing through the center, divides the earth into equal hemispheres. The plane of latitude is always equidistant from the equator; but the plane of east and west vision cuts the equator at the real horizon both ways, and comes out at the antipodes, as far south of the equator as the latitude is north, and *vice versa*.

This idea can be realized and made clear by the artificial globe, in the following manner: To find the regions through which the plane of east and west vision for any place passes, bring the place to the brass meridian, and also revolve the meridian till the place touches the wooden horizon. Then the plane of the wooden horizon will be the plane of of east and west vision for the given place. The sun at the time of the equinox, when it stands exactly on the equator, nevertheless rises exactly in our east, though we are forty-three degrees north of the equator, and as it ascends toward the tropic, rises apparently far to the north of east, though in reality it never comes north of the equator more than twenty-three and a half degrees. These phenomena show that our plane of east and west vision cuts the tropics and the equator, and, instead of coinciding with our latitude, takes nearly a southeast direction to our antipodes, on the other side of the equator.

These facts, says a writer in *The Circular*, ought to be considered by the Jews, who are said to pray with their faces to the east, imagining that they are looking toward Jerusalem. Praying in that position from New York, they are really looking over the Desert of Sahara, and Jerusalem is far away from their line of vision to the northeast. Moreover, their line of vision is in the tangent to the curve of the earth, while Jerusalem is nearly a quarter of the way round the globe on the curve itself, and consequently far below the straightforward outlook. The real direction of Jerusalem from New York, as near as we can calculate with our rude appliances, is thirty-five degrees north of the east line, and forty-five degrees below the horizontal line. In other words, a Jew, in order to pray right at Jerusalem from New York, ought to face by compass about N. E. by E., and look at the ground about six feet before him.

Taxation.

From a very able essay from the pen of E. H. Derby, of Boston, on the position and prospects of the United States with respect to finance, currency, and commerce, we extract the following:—

"Mr. Rollins, in his last report, condemns those taxes whose collection is costly, and his objection applies most forcibly to taxes on gross receipts and incomes. On railways the cost of collection from the public ranges from fifty to ninety per cent. It now averages nearly seventy per cent on our American railways, for two-thirds of the gross receipts are absorbed by expenses, and for each dollar of the tax collected by the railway, three and a third must be taken from the public—such taxes carry with them their own condemnation. A tax on premiums of insurance, which compels the poorer classes to pay for the privilege of guarding their houses and furniture against their most dangerous foe, is also objectionable. To avert pauperism we should stimulate rather than discourage insurance.

"It is urged that the Income tax is a tax on capital. If it be so, let it be continued on coupons and on the dividends of factories, railways, banks, and insurance companies; but when it is applied to the irregular incomes of private citizens and uncertain receipts of professions, terminable with life or health, it may well be questioned. The Income tax in 1865, then three times as high as the English Income tax, was levied on four hundred and fifty thousand people, and doubtless as many more were required to make returns to prove they were exempted by poverty from the assessment.

"If we rate the cost to each individual of posting his books and making his computation at ten dollars only, the cost to the public, besides the salaries of assesors and collectors, would exceed nine millions on the tax payers of 1866, and an equal number exonerated. The estimate of Mr. Rollins for the returns the present year is less than twenty-five millions from the Income tax, while the returns from gross receipts of railways were last year but four millions of dollars. Is it wise to continue taxes so costly to collect?

"But a still stronger objection to the Income tax is the publicity it gives to the private affairs of the citizen. He is obliged to disclose important secrets, often to the injury of his trade and credit, or to the detriment of his family and fortune. No distinction is made between permanent and temporary incomes. With people of limited means, the greenback set aside for a new suit, or to sustain the son in college or the daughter at school, obeys the peremptory call of the collector, and honesty pays what dishonesty evades.

"The operation of the tax is most unequal. Massachusetts, with seven thousand square miles only, contributes more than eight million dollars to the Income tax, while all the Cotton States, with half a million miles of surface, pay but three-fourths of that amount.

"The Income tax is a direct tax on the rents of real estate, and operates as directly and effectually as a tax on the land itself. The constitution provides that all direct taxes shall be levied in equal sums on each Congressional district; but now single districts in New York, Pennsylvania and New England pay more than twenty Southern districts. Such taxes, if continued, may be contested, and large reclamations probably demanded."

Whether an Application for a patent Interferes with Another Patent is a Question to be Determined by the Commissioner of Patents.

An interesting question in relation to interfering applications has lately been decided by Judge Fisher, of the United States District Court, Washington, in the case of Marsh *vs.* Dodge. This case was before the court in February last, on the question of priority of invention of the specific devices by which a self rake is attached to a two-wheeled reaping machine, and was decided in favor of Dodge. Marsh then reconstructed his application and specifications, and began *de novo*. In the outset, he demanded that a new interference be declared between himself and Dodge, that the question might be tried again. The Commissioner of Patents refused to do this, and from his action the present appeal was taken. The following is Judge Fisher's decision:

Appeal by James S. Marsh from the Commissioner of Patents.
A motion is made in this case to dismiss the appeal on the ground of a want of jurisdiction in the Judge to whom the appeal is taken from the Commissioner of Patents. The case is either the same which was decided by me on appeal in the month of February last, or it is a new case between the same parties. If it be the same case, the former decision has put an end to it, so far as respects any appeal to me had before me or any other Justice of the Supreme Court of the District of Columbia. If it be a new case, then I am clearly of the opinion that there is want of jurisdiction in any Justice of the Supreme Court of the District of Columbia, because it is not one of those cases in which appeals are provided for by the law. Since it does not appear that the application of Dodge for reissue did in the opinion of the Court interfere with any other patent, nor is it a case in which either Dodge or Marsh is dissatisfied with the decision of the Court upon the question of priority of right or invention. Had there been an Interference declared in this case and a decision of the Court thereon the case would have been appealable, but whether an application for a patent will interfere with another patent or another application pending, is in my judgment, a matter to be finally determined by the opinion of the Commissioner himself.
The appeal in this case is therefore dismissed.

Spiritualism in the London Polytechnic Institute.

Prof. Pepper has been doing, this last winter, a great work before the thousands who nightly visit the above institution. Besides explaining the latest discoveries in electro-magnetism, light, etc., he discoursed on spiritual manifestations, pointing out the extensive impostures that have been practiced on the public in the name of mesmerism and spiritualism. He illustrates his lectures with startling illusions, such as the floating in the air of hats, tables, and even stout ladies. He does not only every thing that ever spiritualists have pretended to do, but a great deal more; with this difference, however, that he explains how it is done by well known natural and material means, whereas spiritualists pretend that they do it by unknown, supernatural and spiritual powers.

Solid Back Brushes.

Mr. George L. Cannon, 152 Broadway, New York city, has shown us some specimens of brushes comprising all styles in common use, from the tooth to the blacking brush, which are made wholly by machinery and each bunch of bristles separately secured to the back, which is solid, having no cover or veneer. No glue or pitch is used to secure the bristles, each bunch being held by a staple of wire, the ends of which are crossed and seated in a drilled hole. The crossing of the staple ends firmly locks the bristles so that they cannot be removed. It appears to be a very valuable improvement.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office.

FOR THE WEEK ENDING APRIL 28, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

77,157.—ANIMAL TRAP.—A. J. Adams (assignor to himself and Boyd P. Quincy), Portland, Oregon.
I claim the spring, C, and claws, B, in combination with the hinged treadles and the base, A E, all constructed, arranged, and operating substantially as described.

77,158.—LATHE FOR CUTTING IRREGULAR FORMS.—Peleg Barker, Battle Creek, Mich.
I claim the sliding adjustable frame, G, containing the holding devices for the uncut timber, arranged relatively with the curved knife, C, when constructed and operating as described.

77,159.—CAR BRAKE.—William T. Batty (assignor to himself and Griffith Deshart), Canton, Ohio.
I claim, 1st, The supporter, P, with axes, b and c, and crank, R, when used in connection with knuckle joint, O, substantially as and for the purpose herein shown.
2d, The peculiar arrangement and combination of the crank, R, chain, S, pulley, T, iron, W, iron, V and car body, X, the several parts being arranged as and for the purposes herein specified.
3d, The peculiar arrangement and combination of the draw bar, K, knuckle joint, O, supporter, P, and brake lever, H, the several parts being arranged and combined substantially as and for the purpose specified.

77,160.—CHURN.—Wm. T. Best (assignor to himself and Daniel Vaughan), Scranton, Pa.
I claim, 1st, The supplementary box, B, having a converging bottom, and being provided with the slotted and perforated cylinder, C, and used with the staff, E, and its brakers, as and for the purpose set forth.
2d, The frame, N, constructed substantially as described, and provided with a rim around its lower end for collecting the butter, said frame being used in the churn, A, and with the staff, L, and its dashers, as and for the purpose specified.
3d, The gate, d, surrounding the slotted portion of cylinder, C, for regulating the flow of cream to said cylinder, substantially as herein specified.

77,161.—SPRING FOR CHAIRS.—A. M. Blake, Canton, Ohio.
I claim the use of the conical spring, F, in combination with the foot plate, G, plate, E, socket or spindle, D, and chair leg, C, in the manner and for the purpose herein specified.

77,162.—CARRIAGE LOCK.—J. A. Bower, Middlefield, Ohio.
I claim in the brakes for carriages the levers, B B, hinged heads, E E, springs, J J, and rods, G G, as arranged in combination with the thills, A A, in the manner and for the purpose substantially as set forth.

77,163.—MANUFACTURE OF BRICK.—Silas H. Bowman, Half Moon Bay, Cal.
I claim the use of petroleum and peat in the manufacture of bricks, by mixing both or either one of them with a clay of which bricks are to be made, substantially in the manner and for the purposes herein set forth.

77,164.—PIANO FORTE STOOL.—Joshua Briggs, Peterboro, N.H.
I claim constructing the stool with metal legs, c, each having a flange, d, containing a socket, e, to enable the leg to be fastened by and slid from screw, f, which connects it to the seat, and pins, g, to keep the leg in position, substantially as set forth.
Also, combining with each leg, as described, the toe piece, i, of wood, driven into a socket, h, in the leg, substantially as and for the purpose set forth.

77,165.—KEYHOLE GUARD FOR DOOR LOCK.—Asa T. Brooks, (assignor to Russell and Erwin Manufacturing Company), New Britain, Conn.
I claim the combination and arrangement of the oscillating spring guard or wardbar, A, with the latch and tumblers, substantially as and for the purpose described.

77,166.—BOOT AND SHOE CONFORMATEUR.—Lorin Brooks, New York city.
I claim the combination with the horizontal scale or size stick, A, of the vertical sliding standard, B, provided with the scale, d, adjustable arm, C, and spring table, D, arranged and operating substantially as and for the purposes set forth.

77,167.—MECHANICAL POWER.—Charles P. Carter, Poughkeepsie, N. Y.
I claim, 1st, The wheel, d, with teeth, formed as shown and described, in combination with pawls, E E, for imparting motion to flange, f, and arm, J, in the manner shown and described.
2d, The ball, h, when arranged and combined with shaft, g, and flange, f, and pawls, E E, substantially the same as shown, and for the purpose as set forth.

77,168.—INHALING GASES.—Wm. Z. W. Chapman, New York city.
I claim, 1st, Placing the gas pipe, a, in said apparatus, at an angle with the pipe, b, for inhaling through, to obviate the necessity of a valve to prevent the return of the exhaled gases into the gas pipe, substantially as herein described.
2d, The expanding mouth piece, constructed and arranged substantially as and for the purposes set forth.
3d, A suspending device, employed in combination with the breathing apparatus, by which the same is drawn out of the way and supported when released by the operator, substantially as and for the purposes set forth.
4th, The formation of the joints of the apparatus, by compressing the elastic tube between the surfaces of two rigid tubes, as above specified.
5th, The construction and operation of the breathing apparatus, substantially as herein described, so as to administer the gas, if required, during an operation, or while the mouth is open and free therefor, as well as before the patient is rendered insensible, substantially as above specified.
6th, Affixing a gas inhaler to the nose of a patient by the employment of an apparatus, substantially as herein described, in combination with said inhaler, so as to administer gas, while the operator is free to operate upon the patient without the aid or an assistant, as would otherwise be required.
7th, Affixing the apparatus either to the operating chair or other suitable permanent fixture, so as to relieve the operator or patient of the weight and annoyance of the apparatus, while it is at all times ready for use without other aid, substantially as herein described.
8th, The devices illustrated in figs. 3 and 5, adjustable or otherwise, substantially as there represented, for opening the jaws of the patient, as herein set forth.
9th, The employment of an indicator in combination with a respirator and gas receptacle, presenting to the eye of the operator at all times the state of the apparatus and the supply and quantity of gas taken, substantially as and for the purposes set forth.
10th, The diaphragm, substantially as described, to be placed in the mouth to cut off communication being the lungs and the external air through the mouth when the mouth is open.

77,169.—LOOM.—George Cliff, Memphis, Mich.
I claim the combination of the top beam, A, the lathe, B, the breast beam, C, the cloth beam, D, the frame, E, the treadle wheel, F, the shuttle thrower, G, the latch, H, the treadles, I, the pulley, J, the yard beam, K, the pins, L, the spring bar, M, the standard, N, the frame, O, the button, P, the cords, Q, the transverse tie, R, the standard, S, the oscillating frame, T, the connection, U, the spring, V, the hangers, W, the guard wheel, X, the dog and spring, Y, the geared wheeel, Z, the bed, 2, and the cord, 3, when constructed, arranged and operating substantially as and for the purposes hereinbefore described and shown.

77,170.—DIE FOR MAKING THIMBLES AND FERRULES.—J. H. Cole, Milbury, Mass.
I claim jointly the die and plunger, A and B, the coacting surfaces of which have the configuration herein described and shown, for the manufacture of ferrules and thimbles from disks of cold wrought iron, in the manner herein set forth.

77,171.—DRIVE WELL.—Thomas B. Conklin, Rockford, Ill.
I claim the pipe, A, with slits, a, and lips, a', in combination with bands, B, and screen, C, arranged as described.

77,172.—CHURN.—George W. Corbit, James M. Orput and George M. Case, Malta, Ill.
We claim, 1st, The combination of the cam, e f g, bar, f h, and wheel, 1 2 3 4, substantially as described.
2d, The method of connecting and detaching the cog wheel, P, with the other parts by the device substantially as described.
3d, The combination of the cam, e f g, and wheel, 1 2 3 4, substantially as described.

77,173.—ROLLER FOR DRAWING MACHINE.—Francis Cragne George G. Cragne, Lewiston, Me., assignors to Wm. N. Higgins, and said Higgins assignor to himself, F. O. Sands, W. M. Emerson and W. T. McNally.
We claim the within described roll for machines for treating cotton and wool, when constructed and operating as and for the purposes set forth.

77,174.—FARM GATE.—John Curtis, Truro, Ill.
I claim, 1st, The combination of the gate, P, with the crane, z, link or hinge g, and screw rod, E, substantially as in the manner and for the purpose herein shown and described.

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2d, The construction and arrangement of the slotted angular bar, Q, metallic plate, D, and lever, h, when used in combination with a farm gate, and operating substantially in the manner and for the purpose as herein set forth.

77,175.—CUTLERY.—R. E. Curtis, Great Bend, Pa.

I claim as a new article of manufacture, knives or forks constructed substantially as described.

77,176.—CULTIVATOR AND POTATO DIGGER COMBINED.—Martin Darling and Hala Gray, Marathon, N. Y.

We claim the frame, A a, oblique cultivator rake, B b, laterally adjustable plows, C C, and adjustable supporting wheels and standards, e f, all combined, constructed, and arranged as herein shown, and for the purposes set forth.

77,177.—MODE OF ROOFING BUILDINGS.—Charles de Hass, Washington, D. C.

I claim a roof, constructed as herein described.

77,178.—TWEER.—Lewis Donnell, Columbus, Ohio.

I claim a combination of the screw, p, with the revolving top, A, the valve O, the cylinder, C and J, and the handle or lever, N, constructed and operated substantially as and for the purpose set forth.

77,179.—STOVE DRUM.—Nicholas Downes, Syracuse, N. Y.

I claim the shell, B, flues, d d, pipes, C, e, f, g, I, and damper, h, all constructed and arranged as herein shown and for the purpose described.

77,180.—RAILWAY RAIL SPLICE.—Robert Elliott, Chester, Pa.

I claim, 1st, The railroad rail joiner, composed of the double flanged plates, D and F, of wrought iron, the bolt, F, burr, g, and guards, G and H, all constructed substantially as set forth.

2d, The guard, H, overlapping a series of two or more projecting bolt heads, f, to prevent the bolts, F, from working out of their places in case of the accidental removal of some of the burrs, g.

77,181.—WRIST PIN FOR REAPERS AND MOWERS.—John H. Elward, Chicago, Ill. Antedated April 15, 1868.

I claim the combination of the wheel, B, provided with an angular recessed or slotted opening, b, with the wrist pin, C, provided with angles corresponding with the said opening, and a key, a, all arranged and operating substantially as set forth.

77,182.—BEAN POT LIFTER AND CARRIER.—George F. Foss (assignor to himself and Samuel C. Hopkins), East Boston, Mass.

I claim the bean pot carrier, made substantially as described, that is, of the bottom guard, d, the wires, a and b, the cover, g, the connecting piece, e, and the clamp screw, i, arranged and combined, as specified.

77,183.—AMALGAMATOR.—Stephen Fountain, Silver City, Nevada.

I claim casting the pan with a hub, having an opening through it for the shaft to pass through, and having a double wall around this opening to form a steam chamber for supplying heat to the machine, substantially as described.

77,184.—REVOLVING MOLD BOARD.—Joseph S. Godfrey, Leslie, Mich.

I claim the combination of the mold boards, A A, with the cutters, B B, the shares, C C, the shafts, D D, and the frame, E, when constructed substantially as described for the purpose designed and set forth.

77,185.—MODE OF ATTACHING AXLES TO VEHICLES.—Wm. Gray and Henry E. Porter, Hebron, Conn.

We claim, 1st, As a new mode of manufacture, a device for securing together the forward axle and rocker of a vehicle.

2d. The combination of the plate, B, having a round flange, D, plate, F, with a corresponding round flange recess and plate, G F, which encloses and allows the flange, D, to work closely and freely therein, by means of the segmental portion, H, of said plate, and the projections, K, for griping the rocker, A, and axle, E, substantially as and for the purpose described.

77,186.—MODE OF PREVENTING THE CORROSION OF CAST IRON VESSELS.—Chauncey O. Greene, Troy, N. Y.

I claim as a new manufacture the improved article of cast iron vessels, as described herein, and having their interior surfaces prepared or lined by the application thereto of oil and heat, thereby forming a hard, durable lining coat therein, in the manner substantiantially as set forth, and by which said vessels are made non-corrodible, as described.

77,187.—ENAMELING MACHINE.—Henry R. Hall, Philadelphia, Pa.

I claim, 1st, Making the hoppers and scrapers self-adjustable by the application of springs thereto, substantially as shown and described.

2d, Feeding the moldings or other objects to be enameled through the scrapers, by means of endless chains set edgewise, and provided with flat links to prevent indentation of the moldings, substantially as shown and described.

3d, Making the bed plates, b and b2, both or either of them, with their chains or other attached parts, adjustable relatively with the fixed bed plate' b1, its chain and other attached parts, to adapt the machine to the various sizes of moldings or other objects to be enameled, substantially as shown and described.

4th, The endless chains, k k1, their respective ways or lateral bearings, m m', and the mechanism for giving motion to said chains, in combination with two scrapers or a single scraper, substantially as shown and described for the purpose specified.

77,188.—PLOW.—John S. Hall, Pittsburg, Pa.

I claim a mold board and land side united in one piece, the former having the share and point attached to it, and the latter having the "renovator" or sole attached to it, and both united to a standard, A, so as to be readily removed when worn out, and replaced by another mold board and land side, in the manner and for the purpose described.

77,189.—CLOTH DRAWERS.—Henry Heath (assignor to Fisk, Clark & Flagg), New York city.

I claim the combination of a pointed waistband with a cloth leg, constructed with a seam at the rear of the knee, substantially as before set forth.

Also, the combination of the drawers leg, constructed with a seam at the rear of the knee and a band at the lower end of the leg, substantially as before et forth.

Also, the combination of the drawers leg, constructed with a seam at the rear of the knee, with both a pointed waistband and an ankle band, substantially as before set forth.

77,190.—WAGON BRAKE.—Smith S. Henderson, North Cohocton, N. Y.

I claim, 1st. The arrangement and combination of the wagon tongue or pole, l, bent metal bar, H, chain, F, roller, G, and slide bar, E, to connect with the brake bar, D, for operating in the manner herein described.

2d, The brake blocks, c c and a a, hinged together with slotted straps, e e, as constructed and secured to the hinged brake bar, D, the same being connected by levers, d d, with the slide, E, by a plate hinge, f, so as to adjust the pressure of the brakes to the wheels, substantially as and for the purposes set forth.

77,191.—CAPSTAN FOR HOISTING MACHINES.—C. S. Houck, Greenport, N. Y.

I claim, 1st, The combination of lever, H, connecting bar or leg, C, lever frame, L, yoke, K, slide block, b, long arm or connecting bar, e, short arm, g, and rod, f, or their equivalents, when arranged and employed in the manner, or substantially in the manner, and for the purpose herein set forth.

2d, The combination and arrangement of the lever frame, L, or its equivalent, with the brake blocks, d d', and rim or circle, s s, as, or substantially as, and for the purpose herein described, when located with respect to shaft, A, and to each other, substantially as described.

77,192.—SAFETY POCKET.—J. C. Iden, Buckingham Township, Pa.

I claim the catch, E, in combination with the thumb piece, D, spring, C, clasp, A A', with the indentation, G, therein, and hasp, B, substantially as set forth for the purpose specified.

77,193.—HOSPITAL BEDSTEAD.—Anthony Iske (assignor to himself and Benj. Mishler), Lancaster, Pa.

I claim, in combination with my swinging trap, L, the sliding table, Q, with with its grooves, q, supported on the cross braces, I, with the stop, i, together with the arrangement of the several rack bars, D K, when held in pivots, and mode of making and connecting the several segments, all arranged and operating in the manner and for the purpose specified and shown.

77,194.—METHOD OF EXPRESSING LIQUIDS FROM SOLIDS.—D. A. James, Cincinnati, Ohio.

I claim, 1st, The method of expressing fluids from solids, by the pressure of the material to be acted upon, in a tube or trunk, substantially as described.

2d, The perforated trunk, in combination with the cloth or canvas lining, substantially as and for the purposes described.

3d, The combination of the perforated trunk with the discharge valve, C, substantially as and for the purposes described.

77,195.—SAWING MACHINE.—T. Jenkyn, Thetford Center, assignor to Bartlett Burr, Fairlee, Vt.

I claim the construction and arrangement of the reciprocating table, P, hinged table, H, tables, Q T V, saw arbors, C D, and cutter heads, U W, all operating upon the same frame, in the manner and for the purposes herein shown and described.

77,196.—CHECK BRACE FOR CARRIAGES.—I. D. Johnson, M.D., Kennett Square, Pa.

I claim the combination of the two braces, B B, their attachment to the upper half of the springs or spring bars, E E, the braces, A and C, and the flexible plate, B, all constructed, arranged, and employed in the manner and for the purpose herein shown and described.

77,197.—VARIABLE ECCENTRIC.—Timothy Keeler and G. S. Avery, Danbury, Conn.

I claim connecting the rod, C, to the eccentric, A, whereby an oscillating motion is imparted to the rod, C, varying from a line at right angles with the eccentric shaft, and without varying the throw of the eccentric, as herein shown and described.

77,198.—HOG-SCALDING TANK.—Gideon King, Eminence, Ky.

I claim, 1st, The bevels, R R, and the adjustable sheet iron plates, N N, when applied to the tank, G, as and for the purpose described.

2d, The sheet iron, M, with the angle, D D, when confined to the tank, G, as and for the purpose set forth.

3d, The crank, T, cog wheels, K, windlass, H, and rack, E, in combination with the shafts, F F, when arranged, constructed, and attached to the tank, G, as and for the purpose specified.

4th, Rope, A', pulleys, J J, pole, w, and pole, v, in combination with shafts, F F, when constructed and operated substantially as and for the purpose described.

77,199.—SPIKE MACHINE.—Wm. Koplin, New Castle, Pa.

I claim, 1st, The cutter, k, moving in the arc of a circle, in combination with the receding cutter, h, substantially as and for the purpose set forth.

2d. The combination and arrangement of the dies, K K', sliding cutter, h, pivoted stock, s, carriage, t, arm, u, springs, s' v, lever, m, and shaft, m', substantially as and for the purposes described.

77,200.—EQUALIZER.—Augustus Lafever and R. K. Laraway, Battle Creek, Mich.

We claim the combination of a draft indicator, on the draft pole, with an equalizer, D, on the doubletree, F, substantially as described.

77,201.—FRUIT BAG.—W. I. Ludlow, Cleveland, Ohio.

I claim the bag or vessel, A, when provided with a bail, B, and when connected at its under side with a rope or cord, C, to which a double hook, D, or its equivalent, E, is attached, all made and operating substantially as herein shown and described.

77,202.—PAN FOR CONCENTRATING SULPHURIC ACID.—Paul Marcelin and Jos. Saunders, Green Point, N. Y.

We claim providing a pan for concentrating sulphuric acid, with a partition or partitions, a, reaching nearly to the bottom of the pan, substantially as and for the purpose herein shown and described.

77,203.—PLOW FRAME.—Seth March, Norfolk, Va.

I claim the frame, A, provided with the elongated slots, a', for the adjustment of the mold board, and the elongated slot, i', for the adjustment of the plow beam, substantially as described.

77,204.—PACKING FOR ENGINES, PUMPS, ETC.—W. H. Miller, Philadelphia, Pa.

I claim, 1st, The use of calcimine, china clay, or white clay, or their equivalents, as a substitute for dry powdered soapstone, and other dry powdered substances, in their combination with fibrous or other materials in the manufacture of packing.

2d, The use of calcimine, china clay, white clay, or their equivalents, for the purpose above described, in the manner above described, or any other practical application thereof, whereby said substances become ingredients of packing for the stuffing boxes of engines, pumps, and for the joints of other machinery.

77,205.—DRYING APPARATUS.—F. I. Norton (assignor to himself and W. H. Cloud), Tremont, Ohio.

I claim, 1st. An apparatus, substantially as described, for discharging steam into the central openings of wagon hubs, and other similar perforated articles of wood, for drying the same, as and for the purpose described.

2d, The combination of the steam coil, C, and vertical ejecting pipes, d, substantially as and for the purpose described.

3d, The combination, with a drying chamber, A B, of the steam pipes, C d, substantially as and for the purpose described.

77,206.—GRAIN SEPARATOR.—S. E. Oviatt, Richfield Ohio.

I claim, 1st. A grain separating conveyer constructed in sectional carriers, B, provided with bars, D, and fingers, a, so arranged that the axis of the lower end of one carrier is below the axis of the upper end of the next lower carrier, substantially as and for the purpose set forth.

2d, A conveyer or carrier, constructed in sections, with each section provided with bars, D, and fingers, so arranged that the fingers of one sectional carrier will interlap with the fingers in the adjoining carrier, as and for the purpose set forth.

3d, The carrier sections, so arranged in relation to each other, when provided with bars, D, and fingers, a, that the plane or upper end of one carrier substantially as and for the purpose set forth.

77,207.—MOSQUITO-NET FRAME.—G. T. Palmer, Brooklyn, N. Y. Antedated April 14, 1868.

I claim, 1st, A radially folding mosquito net canopy frame composed of folding arms, e e e, disk or support, d, and supporting arm, C, made substantially as and for the purpose shown and described.

2d, Supporting a radially folding canopy frame from under its center by means of the standard, B, and supporting arm, C, when the arm, C, extends over the bed and the folding frame is pivoted thereon, substantially as shown.

3d, The rods, f f, suspended from the folding arms of a mosquito-net frame, for the purpose of folding and unfolding the frame, substantially as shown.

4th, The pins, a" a", in combination with a radially folding mosquito-net frame, whether said pins are affixed to the arms of the frame or fitted in sockets at the ends of the arms, for the purpose described.

5th, Supporting the radially folding arms of a mosquito-net canopy frame by supporting braces, pivoted to the upright, c, substantially as shown.

77,208.—ROADWAY PAVEMENT.—J. T. Parson, Washington, D. C. Antedated April 18, 1868.

I claim a paving block, having an octagonal-shaped end, composed of clay treated as described, and for the purpose set forth.

A paving block of octagonal or other form, designed and arranged so as, when laid, to leave small holes at regularly recurring intervals, for the purpose set forth.

The herein-described baked or burned clay paving block, as a new article of manufacture.

The combination, to form a roadway pavement, of paving blocks, having an octagonal or other form, designed and arranged so as, when laid, to leave small holes at regularly-recurring intervals, and wooden keys, substantially as described.

77,209.—STRAW CUTTER.—G. W. Parsons, Harrisburgh, Pa.

I claim, 1st, The pinion, O, on the end of the shaft, c, of the driving-gear wheel, in combination with the movable and adjustable brace, N.

2d, The internal gear wheel, H, in combination with the driving-gear wheel K, whose shaft is supported by a movable and adjustable brace, as set forth.

3d, The movable and adjustable brace, N, supporting the large gear wheel, K, in combination with the cog pinion, I, on the knife shaft, D.

4th. The pinion, P, fitting on and over the pinion, O, in combination with the shaft, c, and driving-gear wheel, K.

5th, The combination, in a straw cutter, of a feed roller whose shaft moves up and down, with the driving-gear wheel, K, and pinion, O, when said wheel and pinion are supported by an outside brace.

6th, The employment of detachable counterbalances, F F, on the arms of the knife-shaft, D, when combined with a single adjustable rotary knife.

7th, Operating the feed roller, C', of a straw cutter by means of the disks, R, when constructed with cog teeth, f f f, disconnected radially from the hubs thereof, in the manner and for the purpose as described.

8th, The screw nut, T, elastic washer, g, and fixed driving washer, S, with radial ribs, in combination with radial ribs on the hub of the fly wheel, substantially as described.

9th, The construction of the hub and fixed driving washer, with holes, h, for the insertion of wooden pins, substantially as described.

10th, The construction of the shaft, with a hole, g', for the insertion of a wooden pin, with the slot across the hub of the fly wheel, substantially as described.

77,210.—MANUFACTURE OF BALLS, BLOOMS, AND SLABS OF Malleable Iron.—John Player, Norton, England.

I claim the forming a ball, bloom, or slab of iron or steel, made malleable by the operation of puddling, by moving the metal out of the furnace where it has been puddled into a mold or form, in which it is subjected to heavy pressure, substantially as described.

77,211.—CUTTING TOOL FOR PLANING AND MILLING MACHINE. E. T. Prindle, Aurora, Ill.

I claim the cutting tool, composed of the shank, A, cutter, B, with the shoulder, F, and set screws, D and G, when constructed in the manner and for the purpose substantially as herein specified.

77,212.—CHUTE FOR RIVER NAVIGATION.—I. A. Putnam, Mexico, Me. Antedated April 18, 1868.

I claim the construction of a chute for the passage of boats over the shallow or rocky parts or rapids of a river, in the manner substantially as specified.

77,213.—SELF-WINDING WATCH.—Ulysse Humbert Ramuz, Chaux De Fonds, Switzerland, assignor to Henry Hirsh and Seligman Oppenheimer.

I claim, 1st, The rack or ratchet, E, operated by the lever, D, and connected to the cover, A', and to the works of the watch, substantially as and for the purposes herein set forth.

2d, In combination with the means, substantially as herein specified, for winding the watch by the motion of the hinge, the independent button, H, shaft, h, and crown wheel, J, arranged and connected with each other, and with the hands, and with means for holding the button within the case when not required, substantially as and for the purposes herein set forth.

77,214.—HYDRAULIC ENGINE.—F. Ransom, Buffalo, N. Y.

I claim the engine, A, and pump, G, connected to the supply pipe, N, by the brances, o and p, so as to operate in the manner and for the purpose substantially as set forth.

77,215.—TUMBLER HOLDER.—C. Reistle, Brooklyn, N. Y.

I claim a tumbler holder, having a handle, b, ring, c c, projection, d, and button, e, in substantially the manner described and shown, and for the purposes set forth.

77,216.—DISTILLING APPARATUS.—Jane Riley, Cincinnati, O., administratrix of the estate of John D. Riley, deceased, assignor to H. G. Dayton, Maysville, Ky.

I claim, 1st, A condensing apparatus for stills, consisting of the pan, C, and and vessel, D, and receiving the vapors through perforated upright pipes, f, that are covered by cooling caps, k, substantially as herein shown and described, the pipes, f, passing through the pan, C, in the lower part of which cooling liquid is contained, suostantially as herein shown and described.

2d, The above, in combination with a doubler, A, made substantially as herein shown and described.

3d, The water distributer, E, consisting of a pan, from which a series of pipes l l, projects downward, to conduct cooling liquid to the lower part of the condenser substantially as herein shown and described.

4th, The arrangement and combination with each other of the doubler, A, vessel, B, pan, C, pipes, f, condenser, D, having caps, k, and of the distributer E, with its pipes, l, all made and operating substantially as herein shown and described.

77,217.—MITER BOX.—Clark Robinson, Fox Lake, Wis.

I claim, 1st, The combination of standards, C, cross bars, B, and rod, L, constructed to operate substantially as described.

2d, The combination of rods, N, support, S, rod, L, blocks, D, and rods, K, constructed to operate substantially as set forth.

77,218.—BLIND-SLAT FASTENING.—T. F. Rockwell, Yorkville, N. Y. Antedated April 15, 1868.

I claim the pendent plate, , attached to the slat rod, B, and perforated with holes, b, and an oblong slot, c, in combination with the bent wire or rod F, and the socket or guide, D, all constructed, arranged, and applied to the window blind, to operate substantially in the manner as and for the purpose set forth.

77,219.—BRACE FOR BIT.—S. C. Rundlett, Portland, Me.

I claim the arrangement, in the horizontal slot, b, of the slide c, having the shoulder, h, slot, d, edge, e, rod, i, spiral, k, and adjusting thumb piece, j, as and for the purposes set forth.

77,220.—ATTACHING WHEELS TO AXLES.—George W. Swain, Nashua, N. H.

I claim the combination of the latches, E E', with the hub, A, and ring, H, made substantially as described and for the purpose set forth.

77,221.—ROTARY STEAM ENGINE.—Peter Shellenback and John Augsburger, Middletown, Ohio, assignors to Peter Shellenback and James Hudson.

We claim, 1st, The valves, l l, constructed, arranged, and applied in combination with the nut, A, and its sliding pistons, J, in the manner and for the purpose substantially as described.

2d. The combination, in a rotary steam engine, of the slotted block, B, and lugs, m, curved slotted arms, n n, levers, r s, and their connecting mechanism, for reversing the action of the engine, in the manner and for the purpose specified.

3d, The arrangement of the induction orifice, D, in relation to the exhaust pipe, E, and the valves, l l, and pistons, J, in the manner and for the purpose described.

77,222.—BEE HOUSE AND HIVE.—Wm. M. Simpson, Davisburgh, Mich.

I claim the construction of a bee house and hives combined, when constructed, arranged, and operating substantially as and for the purposes hereinbefore described.

77,223.—CAR BRAKE AND STARTER.—L. J. Smith, Hamilton, Ohio, and D. S. Knight, New York city.

We claim, 1st, The slotted and notched or recessed plate, g, when arranged substantially as herein shown and described, for the purpose of throwing the pinion, a in or out of gear, and also for raising and lowering the rack frame, H, substantially as and for the purpose herein shown and described.

2d, The plate, g, when connected with or part of the sliding bar, G, in combination with the pawl, d, carrying a friction roller, j, and with the clutch, b, and spring, i, all made and operating substantially as herein shown and described.

3d, The slotted sliding plate, g, when arranged as described, in combination with the slide, r, fixed frame, E, and rack frame, H, all made and operating substantially as herein shown and described.

4th. The sliding rack frame, A, incombination with the pinion, a, and with the notched bar, l, and spring pawl, J, all made and operating substantially as herein shown and described.

5th, The device for throwing the spring pawl, J, off the bar, l, consisting of the cam, m, slotted plate, plate, p, and sliding bar, K, having two studs, t, and u, all made and operating substantially as and for the purpose herein shown and described.

6th. The bar, K, carrying the studs, t and u, when hinged to the end of the bar, g, and when connected with the adjustable swinging bar, r, all made and operating substantially as herein shown and described.

7th, The rack frame, H, when provided with the pin or stud, w, in combination with the sliding bar, M, and crank, e, all made substantially as described, and operating so as to automatically throw the clutch off the pinion, a, when the rack frame is at either extremity of position.

8th, The rack frame, H, when provided with a notched bar, l, and when fitted around the pinion, a, and axle, B, in combination with the springs, I, or their equivalents, all made and operating substantially as herein shown and described.

9th, A combined railroad car brake and starting apparatus, made and operating substantially as described, and connected with vertical shafts, F F, at the ends of the car, so as to be under complete control of the brakeman, as set forth.

77,224.—BRICK MACHINE.—Peter J. Smith, Philadelphia, Pa.

I claim, 1st, The reciprocating double-acting skeleton clearer, J, arranged and operating substantially as set forth.

2d, The combination, substantially as set forth, of a reciprocating mold, a piston, and an oscillating carrier, with a top plate, A1, and an inclined plane, a', whereby the bricks are compressed during the discharge movement of the mold, as set forth.

3d. The combination, substantially as set forth, of an open-ended box, a reciprocating mold frame, pistons, H, a hopper, E, and a plunger, D, with a reciprocating clearer, which sweeps off the bricks discharged by the molds.

77,225.—MACHINE FOR CUTTING KEY SEATS.—William H. Smith and Rollin S. Eddy, La Crosse, Wis., assignors to themselves, Seth Dean and Henry Merrill.

We claim, 1st, In combination with the slotted pin, d, the cutting tool, C, having its front edge provided with saw teeth, and made tapering longitudinally for the purpose of feeding forward in descending and cutting a key seat, substantially as described

2d, In combination with the reciprocating rack bar, B, the adjustable collars, g' g'', or their equivalents, arranged with the shifting mechanism to operate in the machine, as described, for shortening or lengthening the movement of the cutting tool, C, as set forth.

3d, The guard, U, and spring, U', in combination with the cutting tool, C when arranged as herein described, and for the purpose set forth.

4th, The combination of the pulley, K, and pinion, L, on the same sleeve, the pinion, M, wheel, G, and pinion, I, on the same sleeve, wheel, O, and pinion, N, wheel, F, and pinion, F, attached to same shaft, h, rack, B, and clutch, P, all constructed and arranged as described, for the purpose of giving a reciprocating motion to the cutting tool, C, to cut key seats, as set forth.

77,226.—APPARATUS FOR CONSUMING SMOKE AND GAS, AND INCREASING DRAFT IN BOILER FURNACES.—Daniel E. Somes, Washington, D. C.

I claim, 1st, The drawing or forcing, or drawing and forcing, the smoke, gases, vapors, etc., from the fire chamber of a boiler or furnace, or other heating apparatus, and into the same fire chamber again by a current or blast of air, steam, or vapor, or any or all of them, for the purpose and in the manner set forth.

2d, The drawing or forcing, or drawing and forcing, the smoke and other products of combustion from the fire chamber of a steam boiler, furnace, or other heating apparatus, by means of a current or blast of air traversing one or more different channels from such products of combnation, for a given distance, and then made to impinge on said products so as to mingle with and drive or draw them through a common flue into the originating fire chamber, substantially as and for the purpose set forth.

3d, The drawing or forcing, or drawing and forcing, the products of combustion from the fire chamber of a flue or pudding or other furnace, or steam boiler or other heating apparatus, through the flues of another steam boiler or other heating apparatus, by means of a current or blast of air, or steam or vapor, substantially as set forth.

4th, The combination of the shell, A, and the flues and flue spaces of a steam boiler, with the chamber, D, and its flue openings, a a', and an air pump, fan blower, or equivalent device, substantially as and for the purpose set forth.

5th, The chamber, D, when divided by a partition plate, d d', and combined with a steam boiler or other heating apparatus, substantially as and for the purpose set forth.

6th, The connection and arrangement of the perforated pipes, F and I, with the shell, A, and flue spaces of a steam boiler, or with the chamber, D, or with both, substantially as and for the purpose set forth.

7th, The combination of the air chambers, O O', and pipes, P Q, or their equivalents, whether on the outside of the shell of a boiler or other heating apparatus, or extending through the interior of the same, substantially in the manner and for the purpose set forth.

8th, The combination of the pipes, P Q, or their equivalents, with their interior steam pipes, fig. 11, for the purpose set forth.

9th, The combination of the air chambers, O O', and air pipes, P, or their equivalents, with the flues of a steam boiler or other heating apparatus, substantially as and for the purpose herein set forth and shown in fig. 13.

10th, Heating air by forcing or drawing it through pipes or channels, along or around the shell, or through the interior of a steam boiler, substantially as set forth.

11th, Oxygenizing gas and smoke, as and for the purpose set forth.

12th, The pipes, P and Q, substantially in the manner and for the purpose set forth.

13th, The smoke and air tubes, substantially as shown in fig. 12, and for the purpose set forth.

14th, Generating steam, as set forth and for the purposes described.

77,227.—CORN SHELLER.—Joseph Warren, Lodi, Ohio.

I claim the case, A, having one of its sides provided with a circular depression around the axis of the disk, in combination with the segmental discharging tube, J, in the manner and for the purpose specified.

77,228.—CHAIR SEAT.—G. A. Watkins, Proctorsville, Vt. Antedated April 6, 1868.

I claim a chair or other seat or bottom constructed substantially as described, of a web of splints, D, secured at their ends by means of a rabbet, a, made in and around the face of the frame, A, in combination with the strips, C, held to their places by a strengthening band or hoop, E, essentially as specified.

77,229.—LOOKING GLASS.—Urban A. Woodbury, Morrisville, Vt.

I claim the shaft or pin, G, with its arm, E, and arm, I, connected to glass, B, and to bar, D, in such a manner that the glass can be revolved or adjusted and held at any desirable angle to the bar, D, and glass, A, as and for the purpose herein set forth.

77,230.—MODE OF PRODUCING DESIGNS FOR PAPER.—Walter Bentley Woodbury, London, Great Britain.

I claim the peculiar method, hereinbefore described, of producing transparent designs or water marks upon paper from reliefs or intaglios obtained by the aid of photography, and also of producing, by the same means (with the interposition of paper charged with a greasy substance), of designs, either directly upon stone, or which may be transferred on to stone, for printing by the ordinary lithographic process.

77,231.—PRODUCTION OF ORNAMENTAL SURFACES FOR JEWELRY, ETC.—Walter Bentley Woodbury, London, Great Britain.

I claim the production of surfaces to be used for jewelry and other ornamental purposes by the aid of photography, substantially as hereinbefore set forth and described.

77,232.—PRODUCING SURFACES FOR PRINTING FROM PHOTOGRAPHS.—Walter Bentley Woodbury, London, Great Britain.

I claim, 1st, The method hereinbefore described of improving or adding pictorial effects to the gelatin reliefs by painting thereon by hand with a colored solution of gelatine.

2d, Producing such gelatin reliefs entirely by hand, as hereinbefore described; and

3d, Producing the metallic intaglio from the gelatin reliefs by pressure, substantially as hereinbefore described.

77,233.—WHIP HOLDER.—Alva Worden, Ypsilanti, Mich.

I claim making the clasping extension or extensions a part of one of the jaws of the whip socket, and substantially in the manner and for the purpose herein described.

77,234.—SURCINGLE.—S. V. R. York, Antwerp, N. Y.

I claim the combination of the series of rings, numbered 1 to 12, inclusive, with the surcingle, A and B, long line or rein, D, pastern straps, C and F, and foot strap, E, arranged and applied in the manner and for the purposes shown and described.

77,235.—BITTING ATTACHMENT.—S. V. R. York, Antwerp, N. Y.

I claim the combination, with the neck strap, A, provided with the ring, B, of the elastic webbings, b b, cords, E E, and bearing rings, C C', arranged applied, and operating substantially as and for the purposes set forth.

77,236.—ANIMAL POWER.—Joseph J. Adgate, Liberty, N. Y.

I claim, 1st, A machine for utilizing and economizing animal power, composed of a platform wheel, L, rotating in bearings in a vibrating arm, J, adjustable at any required angle by the supporting attachment, I, held upon the circular projection, K, substantially as shown and described.

2d, The rotating supporting attachment, I, furnished with notches or teeth, a3, in combination with the circular projection, K, and the notches, a1, on the end piece, A, substantially as shown and described.

3d, The device for tightening the supporting attachment, I, upon the circular projection, K, by means of the bolt, e2, and the opposite inclined faces on the attachment, I, substantially as shown and described.

4th, The vibrating arm, J, formed with the projection, c, in combination with the movable bearing, e1, and the spindle, M, substantially as shown and described and for the purposes set forth.

5th, The slots, e and a2, in combination with the bolt, e2, substantially as shown and described and for the purposes set forth.

6th, The manner of joining the end pieces, A and A', with the perch, B, by mortises or slots, and wedge-shaped and dove-tail tenons, substantially as shown and described and for the purposes set forth.

7th, The double-acting friction brake, G, in combination with the wheel, E, substantially as shown and described and for the purposes set forth.

8th, The crank pin, O, arranged to be adjusted in a radial slot in a wheel, F, and secured in place by means of nut and washers, operating substantially as and for the purpose set forth.

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77,237.—APPARATUS FOR RAISING SUNKEN VESSELS.—George M. Allerton, New York city.

I claim, 1st, A series of casings, provided with eyes around their edges, to be secured to the vessel by spikes, in combination with separate air bags introduced within said casings, and capable of inflation, as and for the purposes specified.

2d, An escape air tube, extending below the air bag, substantially as and for the purroses set forth.

3d, A series of air bags, connected to the supply pipe, d, by the tubes, c, in combination with cocks, c' d', as and for the purposes set forth.

77,238.—COMBINED CORN PLOW, PLANTER, AND CULTIVATOR.—Isaiah B. Arthur, Sidonsburg, Pa.

I claim the combination and arrangement of the plow, F, plows, M M R R, beams, J K K, roller, I, lever, I', guards, G G, seed box, C, slide, c, lever, L, shaft, S, and wheel, B, when the said parts are constructed, combined and arranged so as to operate substantially as and for the purpose specified.

77,239.—LARD PRESS.—Solomon S. Avis, Penn's Grove, N. J.

I claim the screw, D, cross bar, E, links, h h', follow block, G, cylinder, I, chamber, m, spout, l, and eye plates, A, all constructed, combined, and arranged substantially as shown and described and for the general purpose set forth.

77,240.—QUARTZ CRUSHER.—Benjamin Babbitt, N. Y. city.

I claim, 1st, The toggles, C, provided with or connected to the shoes, C', in combination with the slides, E, and rubber or other springs, F, all arranged to operate in the manner substantially as and for the purpose set forth.

2d, The securing of the periphery or shell, u, of the roller, J', to its shaft, g, by means of the india-rubber beads, r r, expanded by the fixed collars, q, loose collars, o, and the nuts, t, or their equivalents, all arranged substantially as and for the purpose herein set forth.

3d, The eccentrics, d d, applied or arranged in relation with the slides, E, of the toggles, substantially as and for the porpose specified.

77,241.—MACHINE FOR MAKING PEGS.—Juan S. L. Babbs (assignor to himself and J. B. Ford), New Albany, Ind.

I claim, 1st, The splitting knife, q, and cutting bits, p p, on the under side of the movable head, K, in the sliding lrame, F, when arranged to operate substantially as specified.

2d, The arrangement of the table, M, upon the ways, I, screw shaft, w, ratchet wheel, L, double pawls, v v, levers, R and N N, connecting strips, P P, and spring, T, in combination with the movable frame, F, the several parts being constructed to operate substantially as set forth.

77,242.—PLOW LAND SIDE.—Jerome Bacon, Medina, Wis.

I claim, 1st, The ears, C, attached to the shoe, B, by which the shoe is secured to the land side, thus relieving the rear of the land side from all weight ahd wear, substandially as described.

2d, The slots, d, in the ears, C, by which the shoe is made adjustable, substantially as and for the purpose set forth.

3d, The adjustable shoe, B, applied to a land side, A, in the manner described, and provided with ears, C, having slots, d, adapted to fit over bolts, e, fixed in the land side, A, substantially as and for the purpose herein set forth.

77,243.—FLOOR CLAMP.—J. H. Baker, Saratoga Springs, N.Y.

I claim the arrangement of the pivoted arm, F, and slotted extension arm, F', both having ratchet teeth, and secured together by a set screw, for forcing one board to another, or two or more boards of different widths, constructed to operate substantially as herein set forth.

77,244.—HARVESTER RAKE.—C. L. Barritt, Richland, Mich.

I claim, 1st, The arrangement and combination of the driving pulley, P', or equivalent gear wheel, stud pin, p, and slotted radius bar, E, with the rocking shaft, F, and connected rake, R, substantially as and for the purpose herein described.

2d, The stationary arm hook, H, in combination with the spring catch rod, l, when connected and arranged relatively with the rocking shaft, slotted radius bar, and frame aforesaid, for the elevation of the rake during its return stroke, substantially in the manner as set forth.

77,245.—BITTERS.—John Bender, Lonaconing, Md.

I claim a medical compound or composition, formed by combining the above-mentioned ingredients, substantially as described.

77,246.—FORE-PART IRONS.—James Blease, Richmond, Ind.

Antedated April 25, 1868.

I claim adapting the tool, a, to the different thicknesses of the soles by means of the adjustable lips, substantially as set forth.

Also, adapting the tool, a, to the different purposes herein specified by means of the detachable lips, as shown and described.

77,247.—HAY RAKER AND LOADER.—J. Marcus Boorman, Scarborough, N. Y.

I claim, 1st, So pivoting the apparatus to the vehicle that it may be tilted to bring the driving pinions, m, out of gear with the toothed rims or spur wheels, b, on the rear wheels of the vehicle, substantially as and for the purpose specified.

2d, The attachment of the forks, h, to the endless belt by means of the plates, u, furnished with lips, e", and the studs or rivets, f", substantially as and for the purpose specified.

3d, The transverse rod, n, and pins, s*, in combination with the series of slats, r, their side frames, s, and the frame, A, supporting the carrier belts, B, whereby the slats, r, with their side frames, may be readily detached, substantially as and for the purpose specified.

77,248.—SAFETY TRUCK.—S. Y. Bradstreet, Monticello, Iowa.

I claim, 1st, The combination of the inclined grooved wheels, C C, with the horizontal bracing wheels, F F, substantially as and for the purpose set forth.

2d, The spring, J, in combination with the sliding plate, G, and fixed plate or block, H, substantially as and for the purpose set forth.

3d, An auxiliary truck, provided with inclined wheels, C C, and bracing wheels, F F, and sliding vertically in guides, H H, in the manner and for the purposes indicated.

4th, The combination of the plates, G G, with the wheels, C C F F, the spindles, D D, having shoulders, d d, and the nuts, a a, substantially as and for the purpose specified.

5th, The guide blocks, H H, when supported by pivots, M M, working in elongated bearings, in the manner and for the purposes described.

6th, The rubber cushions, e e, when used in combination with the auxiliary safety truck above described, in the manner and for the purposes specified.

77,249.—MACHINE FOR WOOL BURRING.—Louis Brumbach, Reading, Pa.

I claim the receptacle, G, arranged in respect to the slatted and toothed rollers of a wool-burring machine, as described, and so balanced that it will be raised by a burr carried beneath it, and will fall with its edge in contact with the fleece before the slatted roller strikes the burr, all as and for the purpose described.

77,250.—VEGETABLE SLICER.—Isaac Bullard, Dedham, Mass.

I claim the disk, C, with an opening, F, and cutting plate, a, in combination with the rim, A, and plate, D, and the point, E, and knife edge, H, all substantially as and for the purpose shown and described.

77,251.—FARM GATE.—E. P. H. Capron, Springfield, Ohio.

I claim, 1st, A gate, consisting of the longitudinal bars, A, cross bars, B C and E, braces, E F, connecting bar, a, and ratchets, e, constructed and arranged to operate substantially as herein described.

2d, In a gate, adjustable as described, the use of a pin, f, for the purpose as herein set forth and in the manner described.

77,252.—WASHING MACHINE.—H. J. Case and F. J. Johnson, Sugar Grove, Pa.

I claim an improved washing machine, consisting of a box, A, having mounted therein the grooved roller, B, in combination with the grooved rollers, C and D, mounted respectively in the arms, E and F, hinged independently of each other and provided with the cross bars, c and d, all constructed and arranged to operate substantially as herein described.

77,253.—DRYER.—Solon L. Cheney, Wooster, Ohio.

I claim, 1st, In an apparatus for drying fruit, the arrangement of the furnace, D, chamber, s, drying oven, A, pipe, p, and aperture, s', by which the cold air is caused to traverse the whole length of the furnace, in contact with the floor of the drying oven, in order to thoroughly heat it and utilize its heat, substantially in the manner and for the purposes specified.

2d, In an apparatus for the purpose specified, the flange, m, and wall, w, in combination with the aperture, r, and damper, r1, substantially as and for the purposes set forth.

3d, The non-conducting beds, t t, when arranged along the bottom of the drying oven, and leaving the space, u, between them, for the purpose specified.

4th, The regulator, E, when constructed with the openings, e e, arranged in the manner and for the purposes specified.

77,254.—LAMP BURNER.—George Chinnock, New York city, assignor to City Manufacturing Company, Waterbury, Conn.

I claim in kerosene and like burners, the detachable annular transparent rim or plate, E, arranged in relation to the cone, C, perforated disk, D, and transparent shell, A*, substantially as herein shown and described.

77,255.—MACHINE FOR PLANTING CORN.—D. Chipman and Wm. F. Chipman, Mount Carmel, Ill.

We claim, 1st, The combination of the loose wheels, b, provided with cams b3, ratchet wheel, b1, and spring pawl, b2, arranged and operating substantially as and for the purpose set forth.

2d, The combination of the slides, c c2, levers, D D', and springs, d d', arranged and operating substantially as and for the purpose set forth.

3d, The hand lever, a', pivoted to the swinging arm or standard, a, and operating substantially as and for the purpose set forth.

77,256.—WATER WHEEL.—Jacob Clark, Clarksville, Pa.

I claim, 1st, The wheel having the shaft, B, the plate, B', and the two series of buckets, the latter constructed in the form described, and arranged one above and one below the plate, B', substantially as specified.

2d, The buckets, c c, having the curves v and w, in combination with the plate, B', substantially as and for the purpose specified.

77,257.—ROOFING MACHINE.—Jas. H. Cole, Adrian, Mich.

I claim, 1st, Supporting and guiding the rolling instrument, A, by means of the ways, F F, substantially as and for the purpose set forth.

2d, The guide, J, when applied at the end of the bed, G, substantially as and for the purpose described.

77,258.—WEEDING HOE.—Andrew Coleman, Red Bank, N.J.

I claim, 1st, A weeding hoe composed of a succession of connected corrugations, B B B, etc., formed from the same plate of sheet metal, substantially as and for the purpose shown and described.

2d, The points, D D D, etc., substantially as shown and described, in combination with the corrugations, B B B, etc., all as and for the purpose set forth.

77,259.—APPARATUS FOR DISINTEGRATING ORES.—Jerome B. Cox, San Francisco, Cal.

I claim disintegrating or reducing any gold bearing material by means of agitation and friction with water, so as to permit of the separation of the gold from such disintegrating material, by the ordinary means of sluice box amalgamation, etc.

77,260.—DOUBLE SHOVEL PLOW.—A. J. Craig, Ashmore, Ill.

I claim, 1st, Adjustably attaching the plow standards, D, to the rear ends of the beams, A, by means of the vertical cross heads, a', formed upon the said rear ends of the said beams, substantially as herein shown and described and for the purpose set forth.

2d, Adjustably connecting the handles, F, to the beams, A, and plow standards, D, by means of the uprights, G, constructed and arranged substantially in the manner herein shown and described and for the purpose set forth.

77,261.—SELF-LUBRICATING BOX FOR SHAFTING.—Wellsly W. Crane, Auburn, N. Y.

I claim the combination of the loose, hanging interior bearing, O, slotted in its center, and provided with a depending tube, C, with the elongated receiver E, having a circumferential groove, and suitable bearings for the journals of the hanger, O, to rest on, the whole constructed and used substantially as specified.

77,262.—NAIL MACHINE.—F. Davison, Richmond, Va.

I claim, 1st, The rotary wheel or die, in combination with the plunger, or die, J, vibrating cutter, L, and box, M, all arranged to operate in the manner substantially as and for the purpose specified.

2d, The feed tube, Q, lined with a suitable non-conducting material, and arranged to operate in connection with the cutter by means of spring bar, S, and cam, F, substantially in the manner as and for the purpose set forth.

3d, The combination of the feed tube, K, box, M, cutter, L, wheel, t, plunger or die, J, and discharging ledges, f f, all arranged for joint operation substantially as and for the purpose specified.

77,263.—TOILET ATTACHMENT FOR BUREAUS.—Henry W. Eastman, Baltimore, Md.

I claim the toilet attachment for bureaus above described, consisting substantially of the upright cabinet, B, provided with horizontal shelves, s, the frame, D, swinging on side hinges, and the mirror, M, hinged to the frame D, and provided with an adjusting rod or cord, r, the whole together in the manner and for the purposes specified.

77,264.—REVERSIBLE KNOB LATCH.—Henry H. Ellwell, South Norwalk, Conn.

I claim, 1st, The hub, D, when adapted to be moved longitudinally with its axis through the lock case, to release the latch and admit of its being turned, substantially as described, for the purpose specified.

2d, In combination with the sliding hub, D, the flange, i, surrounding the hole for the passage of the hub, upon the inside of the case, whereby said hub, when operated to release the latch, will not be displaced laterally, as herein shown and described.

3d, The arm, j, of the bar, E, arranged as shown, and in such relation with screw holes, k, as to cause, when the lock is screwed to the door, the arm, j, to bear against the hub, D, and prevent the latter from moving longitudinally to release the slide catch, as set forth.

77,265.—MILL BUSH.—John M. Evril, Center, Pa.

I claim the box, A, provided with groove J, chambers K, blocks C, wedges e, and bolts, D, all arranged, combined, and used substantially as and for the purposes specified.

77,266.—TICKET HOLDER FOR RAILROAD CARS, ETC.—Oliver G. Fessenden and Seth G. Fessenden, Stamford, Conn.

We claim, 1st, The ticket holder made substantially as described, and its equivalents, for the purposes specified.

2d, The roller, E, and its equivalents, for the purposes specified.

77,267.—DOOR LOCK.—Wm. D. Field, Providence, R. I.

I claim, 1st, Providing the bolt, B, with tongued or grooved edges, substantially as set forth, and combining it with the guide plates, C C, as described, so that it will remain on the lock when the inner plate of the same is removed, substantially as herein shown and described.

2d, Forming the arms, h and l, by means of which the bolt is moved, on a plate, E, which is screwed upon the bolt, so that the tumblers are held in place by the said plate, and can be removed when the same is taken off, substantially as herein shown and described.

3d, The bolt, B, plate, E, oscillating and sliding tumblers, D, springs, f, and revolving tube, G, having a projecting arm, l, all arranged in combination with each other and with the key, F, having changeable wards, and all made and operating substantially as herein shown and described.

77,268.—CLOTHES PIN.—Perry Finley, Memphis, Tenn.

I claim a clothes pin constructed of sheet metal and coated with rubber or gutta percha, in the manner and for the purpose set forth.

77,269.—FERTILIZER ATTACHMENT.—C.C. Foster, Odessa, Del.

I claim, 1st, The mode of sowing phosphate, or any like manure, by means of an attachment constructed and operated as above described, or any other substantially the same.

2d, Wings, W S, combined with pins, P, and shaft, S' H', for the purpose and in the manner above set forth and described.

3d, Rollers, R M, springs, S C P, reversed bearings, R V, the whole combined, constructed, and operated in the manner and for the purpose above set forth and described.

77,270.—RAILROAD CAR HEATING AND VENTILATING APPARATUS.—Samuel W. Francis, Newport, R. I.

I claim the combination with the locomotive of the air tube or conduit communicating with pipes opening into the cars, and a removable heat confining jacket surrounding the said conduit, under the arrangement herein shown and described, so that the said conduit and pipes may constitute either a ventilating or a heating and ventilating apparatus, as herein shown and described.

77,271.—DERRICK.—Charles Fricke, Mobile, Ala.

I claim the arrangement of the shoes or sockets, B B, on the horizontal beam, A, adjustable legs, C C, winding drum, H, and cord, N, provided with a ring, and three small cords, g g g, at one end thereof, when operated as described, and adjusted on the joists of a new building, for the purpose of elevating the material therefor, substantially as herein set forth.

77,272.—PLOW.—William Gallagher, Shullsburg, Wis.

I claim, 1st, The combination of the vertical bar, E with the axle, B, and forward end of the plow beam, F, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the levers, K, with the plow beams, F, and vertical arms or bars, E, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the braces, O, with the axle, B, and plow beams F, substantially as herein shown and described and for the purpose set forth.

77,273.—TRESTLE.—James E. Gedney, Petaluma, Cal.

I claim, 1st, The legs, B, attached to the beam, A, by means of the plates D, bolts, E, and thumb nuts, as herein shown and described and for the purpose set forth.

2d, The combination of the beam, A, extension legs, C, legs, B, removable plates, D, having sockets, d', and flanges for the passage of the bolts, I J, thumb nuts, K L, and plates, M and N, as herein described, for the purpose specified.

3d, Securing the extension legs, C, to the legs, B, by means of the bolts, I and J, thumb nuts, K and L, and plates, M and N, as herein shown and described and for the purpose set forth.

77,274.—CLOTHES LINE HOLDER.—James W. Gladding, Normal, Ill.

I claim the jaws, A, and the tongue, D, constructed, arranged, and operating substantially as shown and described, for the purposes set forth.

77,275.—MANUFACTURE OF PACKING FOR STEAM ENGINES.—James Glanding (assignor to himself, David H. Wilson, and Edward S. Lowry), Philadelphia, Pa.

I claim the process herein described of applying lubricating material to packing, that is to say, introducing the material among the fibrious strands during the plaiting of the latter together, and at the point where they are being united, substantially as specified.

77,276.—SPRING AND BODY BRACE FOR VEHICLES.—Christopher C. Gleason, Wauconda, Ill., assignor to himself and L. M. Kimball.

I claim the levers, a and b, and straps, F F, arranged as described, in combination with perch, A and body, E, the whole arranged and operating as and for the purpose set forth.

77,277.—COTTON BALE TIE.—J. H. Gooch, Cheraw, S. C.

I claim the plate, A, constructed with the depression, a a, the bars, c c1 c2, the tongues, m n, and the slots, s and C C', the latter slot being constructed with the recesses, e e', having the inclined edges, i i', and the whole apparatus operating substantially in the manner and for the purposes set forth.

77,278.—FEATHER DUSTER.—M. A. Goodenough, N. Y. city.

I claim in combination with a feather duster, the elastic stem, B, arranged substantially as and for the purposes herein shown and described.

77,279.—POTATO DIGGER.—Alvah Graves, Marcellus Falls, N. Y.

I claim the suspending frame, A, and flexible or swinging connection, c, in combination with the fork, B, substantially as shown, and for the purpose described.

77,280.—WATER COOLER.—John L. Hadden, Philadelphia, Pa.

I claim a sheet metal water cooler, having the bottom, B, of its inner cylinder, A, made of sheet metal, raised and corrugated substantially as described and shown, for the purpose specified.

77,281.—MACHINE FOR CLEANING EMERY.—J. H. Hawes, Boston, and George H. Bliss, West Stockbridge, Mass.

We claim, 1st, The combination with the cylinder, A, of the rotating rubber, D, of serpentine form, substantially as specified.

2d, The combination of the plate or disk, E, with the cylinder, A, and rubber, D, for operation together as described.

77,282.—BELT CLASP.—Jacob H. Hawes, Boston, and George H. Bliss, West Stockbridge, Mass. Antedated April 25, 1868.

We claim, 1st, The clasp constructed with the leaves, a, and internal lips, serving conjointly to hold the ends of the belt, substantially as herein set forth.

2d, The detachable spring slip, B, constructed with the toothed lips, b, and arranged within the shell of the clasp substantially as and for the purpose specified.

77,283.—SHINGLE MACHINE.—Smith Head, Halifax, Pa.

I claim, 1st, The arrangement in a sawing machine, of the four saws, C C1 C2 C3, the two mandrels, a a', each bearing two of the four saws, and the oscillating arms, L L', for the purpose of communicating a reciprocating motion to the mandrels, when used in connection with two bolt carriages, D D', one on each side of the machine, and the whole being constructed and operating substantially in the manner and for the purposes specified.

2d, The combination of the shaft, F, the branks, G G, the pitman, H H', the arms, I I', moving the carriages, D D', and the oscillating post or shaft, K, having the lateral arms, M M', and the longitudinal arms, L L', all the parts being constructed, combined, and operating together substantially as and for the purposes set forth.

3d, The edging apparatus above described, consisting of the mandrel, R, working in the sleeve mandrel, R', and adjusted therein by the set screw, s, the mandrels bearing the auxiliary saws r and r', when constructed and operated substantially as and for the purpose described.

77,284.—PULLEY.—Frederic Hewitt, Newark, N. J.

I claim, 1st, The pulley constructed with the divided hub and the detachable rim, substantially as herein set forth, for the purpose specified.

2d, The combination of the divided rim, the wrought iron arms formed with connecting parts, ax, and the divided hub, substantially as herein set forth, for the purpose specified.

77,285.—TUBULAR STRUCTURE.—Wm. F. Holske, N. Y. city.

I claim, 1st, The rings, A, formed with a groove, a, on each side, and provided with breaks, b, and ears, d', substantially as and for the purpose described.

2d, In combination with the above, the staves, B, tongued and grooved, and formed with tenons, substantially as and for the purpose set forth.

3d, The combination of rings, A, staves, B, and tie rods, C, all constructed and arranged substantially as described.

4th, The rings, A, when provided with loops, D, substantially as and for the purpose set forth.

77,286.—APPARATUS FOR DIFFUSING LIQUIDS.—Chas. Hodge Hudson, Roxbury, Mass.

I claim, 1st, In an apparatus for atomizing liquids, the use of a hydrostatic blower, substantially as described, in combination with an adjustable reservoir for supplying a head of water which will produce more or less pressure in the air vessel or blower, as may be required.

2d, The combination of the cans, A and B, and tube, D, constructed and operating substantially as described.

3d, In an apparatus for applying hydrostatic pressure to produce a current of air to operate an atomizer, a regulating device, substantially as herein described, acting automatically, to adapt the apparatus to the use of an excessive head of water without affecting the strength or evenness of the air current.

4th, In an apparatus for applying hydrostatic pressure to produce a current of air to operate an atomizer, a regulating stop cock in the tube leading from the air vessel to the atomizer, to vary or stop the flow of air, substantially as described.

77,287.—SPECTACLES.—Edward Hunter, Philadelphia, Pa.

I claim the nose piece, C, adapted to projections, b, on the frames of the spectacles, for adjustability of the same, substantially in the manner set forth.

77,288.—STEERING APPARATUS.—Peter H. Jackson, New York city.

I claim the right and left handed screw shaft, c, set in vertical sliding boxes, in combination with the arms, l, that are jointed in pairs to the nuts, m, and extend to the gudgeons, t, of the rudder head, as and for the purposes specified.

77,289.—VISE.—Abiezer Jameson, Trenton, N. J.

I claim, 1st, The combination of a plate, B, jaws, A A', and screw, F, connecting the said jaws, the whole being arranged and operating substantially as and for the purpose specified.

2d, The combination of the said sliding jaws, A and A', movable plate, B, and lower permanent plate, D, the whole being constructed and arranged for the lateral and longitudinal adjustment of the jaws, substantially as herein described.

77,290.—CRYSTAL FOUNTAIN.—John C. Johnson, Louisville, Ky. Antedated April 17, 1868.

I claim the crystal fountain above described, having the cylinder, A, supply pipe, B, pipes, C D, faucets, E F, valves, G H, and bent pipes, I K, communicating with the fountain jet, the whole apparatus being constructed, combined and arranged substantially in the manner and for the purpose specified.

77,291.—TEA AND COFFEE POT.—Amasa C. Kasson (assignor to himself and Nelson C. Gridley), Milwaukee, Wis.

I claim, 1st, A tea or coffee pot consisting of an upper chamber for the tea or coffee, and a lower chamber, B, for hot water, with an outer central tube, C, attached, and cover, D, with tube, E, whistle, F, and hood, I, all constructed and arranged substantially as described.

2d, In combination with the hot water chamber, B, and central tube, C, the cover, D, with hood, I, and tube, E, when constructed and arranged substantially as herein described.

3d, The cover, D, with the tube, E, and conical deflecting tube or hood, I, attached substantially as described.

77,292.—COTTON SCRAPER.—I. J. Kidd, Young's Settlement, Texas.

I claim the cams, C C, in combination with the horizontal bars, H H, beam, L, and plows or scrapers, P P, when constructed, arranged and used substantially as and for the purpose specified.

77,293.—COTTON CHOPPER.—I. J. Kidd, Young's Settlement, Texas.

I claim, 1st, The knives, K K, secured to the disks, H H, and shaft, C, when constructed and operated substantially as and for the purpose specified.

2d, The arrangement of the shafts or axles, B and C, and their cog wheels, D and E, disks, H H, and knives, K K, with the frame, A, provided with cross bar, H, longitudinal pieces, g g, and the plows, L L, substantially in the manner set forth.

77,294.—COLLAR MACHINE.—H. F. Knapp, New York city.

I claim the knives and cutters, I M K, cutting block, D and cutter, L, arranged to operate together, essentially as herein set forth.

77,295.—BELT COUPLING.—C. W. Theodore Krausch, Philadelphia, Pa. Antedated April 21, 1868.

I claim, 1st, An adjustable belt or band clasp (coupling), by means of which also the degree of tightness of a belt or band can be effected.

2d, A belt clasp, combined with a belt tightener, substantially in the manner as and for the purpose set forth.

77,296.—MACHINE FOR TRIMMING TEAZLE.—Elisha Leffingwell, Sempronius, N. Y. Antedated April 16, 1868.

I claim, 1st, The tubes, J J, constructed substantially as described, and used with the pulleys, K K, and their revolving blades, e e, as and for the purpose set forth.

2d, The cutter bar, o, with its cutters, s s, in combination with the tubes, J J, as and for the purpose set forth.

77,297.—TIRE SHRINKER.—John Macy, Pine, Oregon.

I claim the fixed bed, B, provided with the fixed and adjustable clamps, a a', in combination with the sliding plate, C, actuated by the cam lever, D, and the clamps, G G', fitted to the uprights, E E, F F, when all said parts are constructed and arranged in the manner substantially as and for the purpose set forth.

77,298.—GAS METER.—James W. Mahlon, Brooklyn, N. Y.

I claim, 1st, The combination, with the measuring or working chambers, of separate water escapes or outlets and lower receiving chamber or compartment, with valve or valves, for operation in such manner as that the several chambers making up the body of the meter may be relieved of water collecting in them without disturbance or removal of the meter, and when the valves are closed, without establishing communication between the several chambers to interfere with the operation of the meter, substantially as specified.

2d, The combination with the supply chamber, to which gas is admitted from the measuring compartment, of a water escape pipe or outlet, lower water receiving chamber and valve controling said outlet within the latter compartment, essentially as herein set forth, and whereby a single water escape may serve to relieve both the supply chamber and inlet and outlet pipes, also whereby the meter is better protected against being tapped of gas drawn from the inlet pipe, as specified.

3d, In combination with the several nozzles or outlets to the water escape pipes, or their equivalents, from the several gas chambers that compose, or mainly so, the body of the meter, a valve or valvular device, arranged to simultaneously control said outlets, essentially as described.

4th, The hollow and perforated water discharging screw or its equivalent, in combination with the valve or valular device that controls the water nozzles or outlets to the several chambers, or certain of them, of the meter, substantially as specified.

5th, The combination with the water discharging screw, or its equivalent, and valve or valvular device controling the outlets from the several chambers of the meter of an elastic or spring like connection interposed between said screw and valve, essentially as herein set forth.

77,299.—HORSE HAY FORK.—H. C. Mapes, Rushville, N. Y.

I claim the catch, g, and the clamping tine, f, formed with notches, f', arranged in relation with each other, and with the bail, d, tines, a, and handle, b, substantially as and for the purpose specified.

77,300.—MAGIC LANTERN.—L. J. Marcy, Newport, R. I.

I claim, 1st, Forming the box or body of a magic lantern, or other lens lantern, with a double shell, A D, and double chimney, C E, substantially as shown and described and for the purpose set forth.

2d, The slide plate, K, lever, G, grooves, d d and f f, and tube plate, Q, all constructed and operating substantially as shown and described and for the purpose set forth.

3d, The double cylinder, A D, caps, l and G, chimneys, C E, and lens, J J, all constructed and operating together substantially as shown and described and for the purpose set forth.

4th, The cylindrical form of the box or body, A, of a magic or signal lantern, when the diameter of the same is just sufficiently large to contain the condensing lens or bull's eye (or a reasonable approximation thereto), substantially as shown and described, for the purpose of rendering the said lantern more portable, in combination with a sheet metal chimney and condensing lens or bull's eye, J J, all as set forth.

77,301.—STEAM SLIDE VALVE.—Jacob Martin, Cairo, Ill.

I claim, 1st, The combination of the steam chest, B, exhaust pipe, M, and cylinder, J, substantially as herein set forth.

2d, The combination of the suspended plate, I, piston, K, piston rod, N, and spring, L, substantially as shown and described.

77,302.—WATER WHEEL.—M. H. Matson, Horseheads, N. Y.

I claim, 1st, The water space of the curb and wheel, each divided into compartments, 1 2 3, etc., by the partitions, b b, b' b', when combined with the eccentric chutes, a a, the whole arranged and operating in the manner and for the purposes herein set forth.

2d, The combination with the above of the series of gates, d, and the arrangement of the hoop, C, arms, g, and lugs, f, for operating the gates, in the manner and for the purposes specified.

3d, The combination of the convex bearing block, l, bearing, n, with upturned edges to retain the oil, and the adjusting nut, m, the whole so operating as to suspend the wheel, and allow its vibration from the axial line, as set forth.

4th, The combination of the clamping, disks, t t, and bolts, u u, with the globe coupling, S, operating in the manner and for the purpose herein set forth.

77,303.—MACHINE FOR FACING GRINDSTONES.—Reuben B. Matthews, Fitchburg, Mass.

I claim, 1st, Applying the carriage, A, and its above described mechanism to the shaft, a, in such manner as to be enabled to effect its horizontal adjustment, or angle of departure from a horizontal line, substantially as before described.

2d, The combination and arrangement, with the carriage, A, of the tubular screw, k, hollow shaft m, and beveled gear, q, the whole being arranged and operating as before set forth and explained.

3d, In combination with the carriage, A, screw k, shaft, m, beveled gear, q, and shaft, b, the screw, v, as supported upon the adjustable post, w, and provided with the beveled gear, s, in the manner and operating as before set forth.

77,304.—MATERIAL FOR DENTAL PLATES AND FOR OTHER PURPOSES.—John A. McClelland, Louisville, Ky.

I claim, 1st, The methods of preparing and working collodion and its compounds to form an improved material, substantially as herein described.

2d, Forming dental plates of the improved material, prepared as herein described.

77,305.—APPARATUS FOR MEASURING CLOTH.—George R. McIntire, Houghton, Mich. Antedated April 16, 1868.

I claim, 1st, The combination and arrangement of the three rollers, B B C, with the cam, e, hinged dog, d, ratchet wheel, r, dial, D, index, f, and movable frame, a, the whole operating substantially in the manner and for the purpose indicated.

2d, The cloth measuring instrument above described, consisting of the parts referred to in the first clause of this claim, in combination with the shafts, M M', screw, N, guides, G G, and board, H, all constructed, arranged and described substantially as and for the purposes specified.

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77,306.—SPRING BRACE FOR CARRIAGES, ETC.—L. C. Miller, Humphrey, N. Y.

I claim an improved brace, A, for carriage and other springs, constructed substantially as herein shown and described, that is to say, consisting of a longitudinal bar or stem, a1, having two inclined or curved arms or branches, a2, projecting at one end, and having two arms, a3, projecting from its opposite sides, as and for the purpose set forth.

77,307.—FLUID METER.—C. E. Moore, Elizabethport, N. J.

I claim the combination of the hinged meter pan, K, arm I, weight, J, cock, d, pawl, l, ratchet wheel, k, and any suitable registering dials, all constructed and operated substantially as shown and described, and for the purpose set forth.

77,308.—BUILDERS' AND PAINTERS' SCAFFOLD.—Charles Mudge, Ovid, Mich.

I claim, 1st, The slide bars, M, the supports, N, standard braces, Z, the plates, C, provided with slots, E, spur hooks, D, vibrating rods and springs, P, when arranged and operating in connection with hanger plates, F.

2d, The standards, G, the platform supporters H, projections, 3, pawl or clip, X, operated by ropes, R and Q, pulleys, T, and rod, K, when constructed and operating substantially as and for the purposes set forth.

3d, The combination of the forgoing named parts with the adjustable hook plates, I, and braces, L, when arranged, constructed and operated substantially as herein shown and described.

77,309.—CLAMP FOR VEHICLE SEATS.—H. E. Murray, Chester, N. Y.

I claim, 1st, The plate, C, with its rack extension, D, with its pawl, E, the lever, B, hook, K, and link, H, with its foot catch, I, all constructed and operating together substantially as shown and described and for the purpose set forth.

2d, The rubber spring, Q, hollow head, a, and hook, K, in combination with the link, H, lever, B, and pawl, all substantially as and for the purposes set forth.

77,310.—DRAY SADDLE.—John O'Mahony, Savannah, Ga.

I claim in a dray saddle the beveled blocks, C C, secured to the leather covering, A, in combination with the pads, D, and grooved bar, B, said blocks C, being secured to the pads at their centers, for the purpose of preventing such pads from flattening upon the back of the animal, under the weight of the dray, as herein shown and described.

77,311.—FOLDING BED.—F. C. Payne, New York city.

I claim the bed composed of the central frame, A, and two end frames, B, beveled at their contiguous ends, and connected by the slotted hinges, c d, in such manner that with the mattress attached thereto, they may be brought or folded into rectangular form without outwardly extending or excrescent parts, substantially as herein set forth and described.

77,312.—MACHINE FOR BENDING RINGS.—Wm. H. Peckham, New York city.

I claim, 1st, The combination of the revolving axles, B C, adjustable friction rollers D D, upon the concentric bearing plates, d, concentric guides, c, connecting rods, e, and gear wheels, f f, as herein described for the purposes specified.

2d, The device herein shown and described of operating the friction rollers, D D, consisting of the guides, c c, slides, d d, rods, e e, and wheels, f f, all made and operating substantially as herein shown and described.

3d, Adjusting the friction rollers, D D, around the larger roller, C, and with relation to the upper adjustable roller, B, by means of the curved plates d, operated in concentric guides around the roller, C, by the connecting rod, e, and gear wheels, f f, as herein described.

77,313.—BUTTON.—F. J. Perkins, Salem, Mass.

I claim the disk, b, formed with parallel lips, b', in combination with the plate, d, having parallel straight sides, and each slotted as described, for application to the circumferentially grooved stem, a, of the button, essentially as shown and set forth.

77,314.—GAS TUBE.—Edward L. Perry, New York city.

I claim as a new article of manufacture impervious flexible gas tubing, composed of rubber and paper tubes, substantially as and for the purpose described.

77,315.—CLOTHES WRINGER.—M. Pierce, Winona, Minn.

I claim, 1st, The yoke frame, G H, applied to the main frame, A, and carrying lower roller of machine, substantially as described.

2d, Extending the shaft, E, of the upper roller, D, at one side of the wringer, and the shaft, E, of lower roller, D, at the other, so that a crank handle may be applied to one or both at the same time, substantially as described and for the purposes specified.

3d, The wooden spring, J, when constructed, arranged and applied substantially as and for the purpose described.

4th, Making the upper roller, D, of larger diameter than the lower roller, when the shafts of both rollers are extended and in opposite directions, so that the power may be applied to the smaller roller, when it is only desired to use one crank, substantially as described and represented,

77,316.—ENVELOPE.—Charles R. M. Pohle, Richmond, Va.

I claim the manner I connect the different parts and close the whole.

77,317.—DEVICE FOR PREVENTING HORSES FROM DRAGGING WEIGHTS.—Alexander Pope, Jr., Dorchester, Mass.

I claim, 1st, The bar or lever, A B, provided with a cross piece, c, or its equivalent, in combination with cross bar, D, substantially as and for the purposes specified.

2d, The swivelled bar, D, provided with the fastenings, d s, as and for the purpose set forth.

3d, The attachment to a horse's bit of the lever, A B, and swiveled cross bar, D, as and for the purpose described.

77,318.—CHECK REIN SLIDE.—W. B. Potter, Boston, Mass.

I claim the check rein slide, constructed as described, as a new article of manufacture.

77,319.—GATHERING TURPENTINE.—A. Pudigon, Charleston, S. C.

I claim the V-shaped sheet metal gutter, b, substantially as shown and described.

77,320.—TOY.—Joshua Pusey, Philadelphia, Pa.

I claim a toy arranged, constructed and operating in the manner as above set forth and described.

77,321.—PLATFORM BRIDGE FOR RAILROAD CARS.—Amos Rank, Salem, Ohio.

I claim a bridge or footing, C, constructed with recesses, c c, or their equivalent in its side edges, and adapted to be applied between railway cars which are coupled together, substantially as described.

77,322.—MECHANICAL MOVEMENT.—Granvil Rich, Smithville, Mo.

I claim, 1st, The combination of the lever, I, rope or strap, K, wheel, C, rope or strap, L, and wheel, E, all as shown and described.

2d, The combination of the wheel, E, constructed with the hub, c, on one side, and having on the other side a pawl, G, and spring, b, with the ratchet wheel, F, all as shown and described.

3d, The combination of the wheel, E, constructed with the hub, c, pawl, G, and springs, d and b, all as shown and described.

77,323.—COMPOUND FOR TEMPERING CAST-STEEL.—Granvil Rich, Smithville, Mo,

I claim, 1st, The compound, as described, and for the purposes specified.

2d, The process of tempering steel by the use of said compound, as described.

77,324.—HELIOMETER,—Conrad Friedrich L. Risch, Huntingburg, Ind.

I claim, 1st, A heliometer, constructed and arranged to operate in the manner herein shown and described.

2d, The arrangement of the northern and southern polar surfaces on opposite sides of the revolving cube, C, substantially as herein shown and described.

3d, The revolving dial-plates, h, when arranged within the stationary dial-plates, d and e, and when arranged within the circle on which the degrees of longitude are marked, substantially as and for the purpose herein shown and described.

4th, The semi-cylindrical sun-dial, D, when arranged as set forth, and when provided with a gnomon, l, substantially as and for the purpose herein shown and described.

5th, The semi-cylindrical sun-dial, D, when arranged as set forth, in combination with the double polar surfaces of the revolving cube, C, upon which the dials for the northern and southern hemispheres are respectively arranged, substantially as and for the purpose herein shown and described.

6th, The triangular plate, E, provided with a hand or pointer, K, when connected with the revolving cube, and when combined with the semi-ann lar arc, c, substantially as and for the purpose herein shown and described.

7th, The flange around the plate, E, when provided with a hole at m, for a ray of light to fall upon the opposite arcs, substantially as and for the purpose herein shown and described.

8th, The curved block, l, when attached to the revolving plate, E, and when combined with the arc, c, and when graduated, substantially as and for the purpose herein shown and described.

9th, The plate, when arranged in combination with the cube, C, and arc, c, all made and operating substantially as herein shown and described.

10th, The arrangement of the hour lines, latitude lines, and diagonal lines, on the plate, F, as set forth.

11th, The plate, F, when arranged as set forth, and in combination with the stationary day and night divider, n, on the arc, c, made as described.

12th, The plate, F, when arranged as described, in combination with the plate, E, and arcs, c c, and with the cube, C, all made and operating substantially as herein shown and described.

13th, The plates, E and F, in combination with the sun-dials on the revolving cube, C, made as described.

77,325.—HEATER RANGE.—Abraham K. Sanders, Brooklyn, assignor to himself and John H. Burtis, New York city.

I claim, 1st, The arrangement of the flues, o o, and dampers, 7, at the sides of the range, in the air-spaces, d, in combination with the flues, g, to the ovens, h h, as and for the purposes specified.

2d, The heating chamber, k, provided with the plates, 8 and 9, in combination with the flues, o o i and p, and ovens, h h, the parts being arranged and operating in the manner and for the purposes set forth.

77,326.—WASHER.—Thomas Shaw, Philadelphia, Pa.

I claim the washer, d, constructed as described.

77,327.—BOILER UPON STOVEPIPE.—Morrill A. Shepard, Bridgeport, Ill.

I claim, 1st, The cone-shaped pipe, A, connected with the vessel, S, as shown and described.

2d, The inverted cone-shape pipe, B, attached to the pipe, A, for the purpose set forth, as specified and described.

77,328.—WHISTLE.—Patrick Slevin, John Slevin, and Francis Slevin, New York city.

We claim the combination of the bow-shaped holder and reed, substantially as and for the purpose described.

77,329.—EXCAVATING VEHICLE.—James P. Smith, Cherry Hill, Pa.

I claim, 1st, The combination of the shovels, D, provided with friction rolls, with the eccentric, F, and wheel, P, said eccentric being adjusted by means of a rod, a, and lever, H, all constructed, arranged, and operating as and for the purpose herein shown and described.

2d, The hollow band, C, provided with a scraper, K, in combination with the wheel, B, when said band is adjustable simultaneously with the eccentric, F, by means of the rod, f, and lever, H, all constructed and arranged as described, and for the purpose specified.

77,330.—STONE-DRILLING MACHINE.—A. M. Southard and W. J. Hobson, Savannah, Mo.

I claim, 1st, The arrangement of the cans V, upon the slotted brace, W, by the bands, z, and bolts, y, for adjusting he same to operate with bars, L L, as set forth.

2d, The slotted plates, x' x', when constructed and used in combination with the bars, L L, for the purposes described.

77,331.—PIPE COUPLING FOR RAILROAD CAR HEATER.—Thomas S. Speakman, Camden, N. J.

I claim, 1st, A pipe, F, having a bell mouth at one end, arranged beneath a car as described, and adapted for the reception of a flexible tube, G, which communicates with a reservoir beneath another car, and slides in the pipe, F, all as set forth.

2d, The reservoir, B, communicating with the tubes, H and G, and having a recess for the reception of a coupling-pin, D, substantially as specified.

77,332.—FILE HANDLE.—H. C. Storrs, New York city.

I claim the internally and externally threaded nut, O, in combination with the chambered handle, A, for holding the shank, c, of the tool, B, substantially as specified.

77,333.—COMBINED SCREEN AND SHOVEL.—Augustus Thayer, Albany, N. Y.

I claim, 1st, A combined scoop and screen, provided with a removable bottom or slide, and a removable or sliding screen, arranged in the manner substantially as shown and described.

2d, The flap or door, C, arranged with a spring to operate in the manner substantially as and for the purpose specified.

3d, The combination of the screen and removable bottom with the flap or door, C, all constructed, arranged, and applied to operate in the manner substantially as and for the purpose set forth.

77,334.—FOLDING BEDSTEAD OR CRIB.—R. S. Titcomb, Gloversville, N. Y.

I claim, 1st, The combination of the plates, F, attached to the bars, D, of the bed frame, with the plates, E, secured to the posts, A, substantially as herein shown and described, and for the purpose set forth.

2d, The combination of the plates, F', attached to the bars, D, of the bed frame, with the plates, G, secured to the stationary part, C, of the end boards, substantially as and for the purpose specified.

77,335.—OPERATING THE HARNESS IN LOOMS.—Frederick Traub, Philadelphia, Pa.

I claim, in the combination with the frame, B F, the upper and lower series of levers, and the mechanism for operating the same, arranged as herein set forth and described.

77,336.—STEAM PUMPING ENGINE.—Joshua Tufts, Athens, O.

I claim the provision, in a steam cylinder, of the hollow piston and rod, F and B, communicating with the feed water of the boiler, in the described combination, with a stationary plug, C, substantially as set forth.

77,337.—FELLY DOWEL PIN.—E. D. Tyler, Gibson, Pa.

I claim a tubular metal felly dowel pin, employed substantially as herein described.

77,338.—SUPPORT FOR PASSENGERS IN CARS.—Henry S. Vrooman, Boston, Mass.

I claim a double-acting flexible passenger support in horse railroad cars, constructed substantially as and for the purpose herein shown and described.

77,339.—BED BOTTOM.—Charles Walker, Chester, Vt.

I claim the spring bed bottom, constructed as described, and consisting of the transverse supports, C, spring cross slats, D, blocks, E, springs, B F, slotted slats, A, and loose cross bars, G, provided with pins, H, all constructed, arranged and operating substantially as and for the purposes specified.

77,340.—WASHING MACHINE.—J. T. Wheeler, St. Charles, Ill.

I claim a washing machine, consisting of the box, A, lever, F, gear wheels, C and D, and stirrer, E, provided with the spreading pins, e, when constructed and arranged as herein described and for the purpose set forth.

77,341.—ANIMAL TRAP.—W. J. Woodside, Zanesville, Ohio.

I claim, 1st, The combination of the perforated plate, D, knives, L, sliding block, J, connecting rod, I, crank, H, and shaft, E, with each other, whether said shaft is operated by a weight or spring, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the bait hook, N, short shaft, o, crank, P, and trigger bar, Q, with each other and with the cam, M, upon the shaft, E, for the purpose of tripping the trap, substantially as herein shown and described.

3d, The combination of the bent or hook lever, R, with the cam, M, and trigger bar, Q, for the purpose of setting the trap, substantially as herein shown and described.

77,342.—SUGAR PAN DERRICK.—David Young, East Topsham, Vt.

I claim, 1st, The steadying staff, G, and frame, a b b, substantially as shown and described, in combination with the cord, I, and derrick, A B D, all as and for the purpose set forth.

2d, The block, E, bearing the pulley, e, and held between the arms, B, of the derrick, when said block is slotted for the passage of the vertical bar, G, which steadies the pan as it is elevated by the cord, I, as herein shown and described.

3d, The arrangement of the steadying bar, G, frame, a b b, pulley, e, slotted block, E, arms, B, and elevating cord, I, with relation to the derrick, A D, whereby a series of pans in a row is elevated in a vertical line without removing the derrick, as herein shown and described.

77,343.—MEDICAL COMPOUND.—Robert Alexander, Eugene City, Oregon.

I claim the combination of the foregoing mixtures of medicines, to be used for the cure of cancer in the human system.

77,344.—ATTACHING DOOR KNOBS TO SPINDLES.—William H. Andrews (assignor to Burton Mallory), New, Haven, Conn.

I claim forming upon one angle of the spindle a flat surface parallel with the axis of the spindle, combined with a set screw in the neck of the knob, so as to secure the knob to the spindle, substantially as set forth.

77,345.—WAGON BRAKE.—David M. Bailey, Carlisle, Pa.

I claim the manner of securing rubber blocks to a bar in a wagon brake, substantially as specified.

77,346.—WRINGING MACHINE.—Selden A. Bailey (assignor to Bailey Washing and Wringing Machine Company), Woonsocket, R. I.

I claim, 1st, Flanged teeth, with their extremities enlarged and nearly circular in form, and with shanks diminishing toward the hub, substantially as shown and described.

2d, A gear having a separate flange on each tooth, as and for the purpose set forth.

3d, The collars, D, constructed to admit and retain the stiffening rods of the rolls, substantially as described.

4th, The stiffening rods, d, so fitted and held in the collars as to allow end play, substantially as and for the purpose set set forth.

77,347.—NUT MACHINE.—Albert B. Bean (assignor to himself and W. Scranton), New Haven, Conn.

I claim the arrangement of a spring or springs, f, upon the face of the cam, so as to yield at the point of pressure, and relieve the strain upon the machine, substantially as herein set forth.

77,348.—JIB BOOM.—William E. Beman, Portland, Me.

I claim the jib boom, a, when hinged to the bowsprit, in the manner herein set forth and for the purpose specified.

77,349.—SPIT FOR ROASTING MEATS.—Elijah W. Bigelow, Worcester, Mass.

I claim, 1st, The frame, A, with standards, C C', constructed as described, so as to receive the dripping pan, B, and support the spit, D, for the purpose set forth.

2d, The spit, D, provided with the rectangular portion, h, in combination with the slot 1, of proper size to fit said rectangular portion, as set forth.

3d, The detachable standards, C C', constructed as described, in combination with the lugs, a a, as and for the purpose set forth.

77,350.—SLED KNEE.—John W. Blake (assignor to Amaziah T. Howes), Jefferson, Wis.

I claim the metallic sled knee, consisting of the upright, A, and brace or braces, B, with their extensions, a b and x, each made and arranged as described, and combined with plates, D and E, in the manner herein shown and specified, the whole arranged and operating as and for the purposes set forth.

77,351.—CORN PLANTER.—John M. Blessing, Jeffersonville, Ohio.

I claim the arrangement of a reciprocating feed bar, J, having the boss, j, in combination with the rollers, I I' G G', and openings, h, as and for the purposes set forth.

77,352.—CHURN.—Caleb H. Bradley, Coatesville, Pa.

I claim the construction of flues or passages of escape for the air from the buckets or chambers, with the projecting covering for the mouth of the flues, as and for the purposes herein described and set forth.

77,353.—REEL.—Jarius Brown (assignor to himself and Theodore B. Hubbard), Portland, Mich.

I claim the combination of the adjustable sleeves, H and J, arms, L, bars, M, braces, N, bar, D, having a screw thread, E, and being hinged at C, with the holder, A, wheel, F, and spring, G, all constructed and arranged substantially as and for the purposes described.

77,354.—ADJUSTABLE HARROW.—J. C. Center, Bath, Ill.

I claim, 1st, The harrow, consisting of one or two draft beams, A A', and frame beams, B B' and C C', hinged together as described, and arranged and operating substantially as set forth.

2d, The hinges, D D' and G G', constructed as described, in combination and connection with the parts of the harrow, substantially as herein described and specified.

77,355.—MOP WRINGER.—B. B. Choate, Springfield, Vt.

I claim the bars, A and B, pivoted together and curved as represented bar A, being provided with the hooks, d d, and the two used in combination with the rollers C and D, and a mop pail, as and for the purpose set forth.

77,356.—STARCHING APPARATUS.—W. B. Coates, Philadelphia, Pa., assignor to David Lyman, Middlefield, Conn.

I claim the starching device herein described, consisting of a rigid vessel, A, closing means, B, and a strainer, C, constructed and adapted to operate substantially in the manner and for the purpose herein specified.

77,357.—TENONING CHISEL.—Andrew J. Cochran, Indianapolis, Ind.

I claim the combination of the bits, B B, with the stock, A C, key, D, and right and left screws, when constructed and arranged to operate substantially as described.

77,358.—DUST PAN.—D. C. Colby (assignor to Josiah Humphery), Washington, D. C.

I claim a dust pan, provided with the part, B, so arranged as to serve for the incline on which to receive the dust, and also as cover to the box part, A, for the purposes specified and set forth.

77,359.—VALVE FOR SUGAR PAN.—Lewis Colwell, New York city.

I claim, 1st, In combination with a sugar pan, a valve, inclosed in a globular chest, arranged so as to concentrate the sugar into a solid stream as it issues from the chest and pan into the receiver.

2d, The use of a puppet valve, inclosed in a chest, in combination with a sugar pan, substantially as described.

3d, The use of the breaker, c, on the end of the valve stem, to break the crust of the sugar, and clear the neck of the pan or nozzle of the valve chest and allow a free exit for the sugar, substantially as described.

4th, Arranging the valve stem guide, e, in the chest, substantially as described, by which it, the valve stem and breaker, can be removed out of the chest by simply taking out the screw in the end of said valve stem guide.

77,360.—WAGON BRAKE.—J. B. Cook, Lyons, Iowa.

I claim tongue, C, yoke piece, B, lever, A, rod, K, chains, L L and O O, lever J, brakes, H H, and doubletree, D, all arranged and operated as and for the purpose described.

77,361.—LOOM.—Geo. Crompton, Worcester, Mass.

I claim, 1st, In combination with the shipper lever, the swing latch, t, arranged to hold the lever in position, substantially as set forth.

2d, In combination with a swing latch for holding the shipper lever, the fork, x, rack gear, w, and segment gear, v, operating together, substantially as described.

3d, Combining the shipper lever latch mechanism with the hand lever, z, at the opposite end of the loom, substantially as and for the purpose set forth.

4th, The shipper fork, mounted on the rocking arm, and connected, substantially as described, with the shipper lever.

77,362.—DRYER.—L. J. Crow and G. Sanderson, Fredericksburgh, Ohio.

We claim the metallic furnace, B, when made cylindrical on its upper face and tapering from its mouth to the smoke pipe, C, and arranged under the box, A, with its drawers and ventilating openings, whereby the flow of heat to the fruit is equally distributed, in the manner as specified.

77,363.—KNITTING MACHINE.—J. Dalton, Brooklyn, N. Y.

I claim, 1st, The point slides, C C, arranged in a tilting frame, C', and reciprocated toward and from the needles by the direct action of the jacquard plates, substantially as and for the purpose described.

2d, The spiral stop, A, with its ratchet gear or equivalent, operating with the thread guide and needles, as described, in combination with jacquard cards, B B, and point slides, C C, controlled by said cards for the purpose of narrowing the goods, substantially as herein specified.

3d, The ratchet cam, D, in combination with the spring guide, F, stationary pawl, G, and pawl, H, substantially as and for the purpose herein set forth.

4th. The suspended reciprocating pawl, H, in combination with the ratchet cam, D, and spiral stop, A, and its ratchet wheel, I, substantially as and for the purpose herein described.

5th, The perpendicular slide bar, J, operated by the shoe, K, and cam, L, or their equivalents, and acting in combination with the thread guide, M, and moving, by means of its pawl, H, the spiral ratchet, all substantially as herein described.

6th, The sliding thread guide, attached to the regular thread guide, in combination with the horizontal lever, which acts directly on the upright slide thread gide, and is operated by the upright shaft that drives the spiral ratchet gear, substantially as and for the purpose set forth.

7th, The point slide transverse stay bar, S, turning in contact with the point slides in the direction opposite to its foward movement, substantially as and for the purpose herein set forth.

77,364.—HORSE-HITCHING DEVICE.—F. Deming (assignor to John B. Anthon and Henry A. Wheeler), Bridgeport, Conn.

I claim, in combination with the hook, A, formed upon the plate, B, the spring, C, having one end fixed and the other bearing upon the surface of the plate, and curved so that the surface of the spring bears upon the end of the hook, and so as to close the same in the manner described, and with this combined, the ring, D, as and for the purpose specified.

77,365.—FISHHOOK.—R. A. Fish, Worcester, Mass.

I claim, 1st, The method of adjusting the line to the hook, as shown in fig. 3.

2d, Leaving the end of the wire, A, in such position that by pressure it will turn the point of the hook, C, either up or down, causing it to hook the fish either in the upper or lower jaw, thus overcoming the difficulty of the old style hook, which often slips flatwise from the mouth of the fish without hooking, constructed substantially as and for the purpose shown and described.

77,366.—ICE BREAKER.—Andrew Flannigain, Trappe, Md.

I claim projecting finger beams, D D, combined with the front edge, w, of an inclined frame, A, on either side thereof, and with cutting blades arranged at their intersection with said frame, and operating to cut the ice on the upper and lower sides thereof, all substantially as and for the purpose herein set forth.

77,367.—DOUBLE SLIDING OR TURNING GATE.—R. Fleming, Victory, N. Y.

I claim, 1st, In combination with said gate, and as a component part thereof, the pulleys, O and T, and the pulley, Q, in the stand, R, as above set forth.

2d, The five posts, in combination with the cords, W, and cords, A' and B, when all are constructed in the manner and used as and for the purpose specified.

77,368.—MACHINE FOR SLAUGHTERING HOGS.—J. J. Fouts, Middletown, Ohio.

I claim the construction, combination, and arrangement of the frame, A B, extended rails, C, pulley-supporter, E, with the adjustable platform, I, and windlass, H, in the manner and for the purpose described.

77,369.—EXPANDING MANDREL.—Martin Gardner, Sr., Carlisle, Pa.

I claim, in combination with the mandrel for chucking wheels, pulleys, washers, and other articles, the arrangement of the radial "gibs" and their inclined planes, the longitudinally moving screw cylinder and its inclined planes, and the screw, D, all constructed and arranged as described.

77,370.—PNEUMATIC TOOTH BURR AND DRILL.—George F. Green, Kalamazoo, Mich.

I claim, 1st, The combination of a rotary engine, operated by means of compressed air, with a burr and drill, in the manner and for the purposes set forth and described.

2d, The mode of attaching the burr or drill to the holder, in combination with an engine, as set forth and described, in the manner and for the purpose specified.

3d, The mode of attaching the burr or drill holder to the shaft of the engine, in the manner and for the purpose specified.

4th, The combination of burrs or drills, rotating in one direction, with an engine, as set forth and described, in the manner and for the purpose specified.

77,371.—PORTABLE FENCE.—C. S. S. Griffiing, Unionville, Ohio.

I claim, 1st, The post for a portable fence, composed of the pieces, A B C and D, arranged in relation to one another substantially as and for the purpose set forth.

2d, The post, when constructed with side braces, B B, of unequal length, and an inclined sill piece, A, substantially as set forth.

77,372.—ANIMAL TRAP.—Benj. F. Hancock, Monroe, Wis.

I claim the door, F, rod or trigger, h, spring, m, platform, G, and rods, d and c, all constructed, arranged, and operated, substantially as and for the purpose described.

77,373.—ROTARY ENGINE.—Dexter D. Hardy, Cincinnati, Ohio, assignor to Henry J. Behrens, Henry C. Dart, and Edward Dart, New York, N. Y.

I claim, 1st, The concentric fixed hubs, recessed substantially as described, in combination with the two geared shafts, their attached pistons, and the cylinder or case, substantially as set forth.

2d, The pistons, attached to the facing sides of the two disks, secured to their respective shafts, and so arranged that the piston or pistons of one shaft work against the face of the disk of the other shaft, substantially as herein described.

77,374.—FLOUR PACKER.—Silas Hewitt, Seneca Falls Village, N. Y.

I claim the combination of the weighing receiver, T, provided with its hinged bottom, the vertical shaft, E, follower, D, and cam, G, all constructed, arranged, and operated substantially as and for the purpose herein set forth.

77,375.—RAFTER HOOK FOR HOISTING APPARATUS.—David Hicks and Sidney Doty, Pontiac, assignors to themselves, Jerome B. Sweetland, Charles E. Adams, Samuel N. Bronson, and Alonzo Barbour, Oakland, Mich.

We claim the combination of the hooks, A and B, with the lever, D, the latter constructed as described, and pivoted between the plate, C, and lower end of the hook, A, in such a manner that its outer end is extended up the side of the hook, B, and made to force said hook against and penetrate the rafter as specified.

77,376.—MILKING STOOL AND PAIL HOLDER.—L. B. Hoit, Cedar Falls, Iowa.

I claim, as a new article of manufacture, a combined milking stool and pail holder, constructed substantially as described.

77,377.—RACK FOR HATS AND DISHES.—W. W. Horton, Katonah, N. Y.

I claim the combination of the feet, A, standards, B, slotted at E, and an expansion frame, composed of divisions, D, jointed to each other, and having parallel rods, 1 2, as specified.

77,378.—VIAL.—W. Storer How, Cincinnati, Ohio. Antedated April 22, 1868.

I claim providing the neck of a bottle, vial, or jar with one or more apertures, d d', which are so located as to be closed when the cork or stopple is completely inserted, and to be opened when the said stopple is partially withdrawn, as and for the purpose herein described and set forth.

77,379.—MANUFACTURE OF SADIRONS.—A. Y. Hubbell, Elmira, N. Y.

I claim casting the top or hollow parts with rivets, upon which is cast the lower part of the iron, the intervening space or chamber being either supplied with a filling or a vacuum, created substantially for the purpose described.

77,380.—SADIRON HOLDER.—Josiah Humphrey Washington, D. C.

I claim the combination of the three pieces, A B A, lined with pasteboard, or some other non-conductor of heat, punctured and made rough on their under surface, and riveted to accovering of cloth or other cheap material, for the purpose of holding and handling flat-irons, tailors' irons, and for use about stoves, ranges, furnaces, forges, &c., the whole being constructed substantially in the manner and for the purpose described.

77,381.—MANUFACTURE OF CARBONATE OF SODA AND POTASH.—A. G. Hunter, Flint, Wales.

I claim the process of converting the sulphate of soda or sulphate of potash into the corresponding carbonate by double decomposition with bicarbonate of lime, substantially as described herein.

77,382.—CARRIAGE POLE SUPPORT.—Hosea B. Hurd (assignor to himself, John N. Hurd, and Samuel Hurd), Aurora, Ill.

I claim the combination and arrangement of the tube, b, spring, c, bar, F spring, d, shoulder, h, and lip, g, with the axle, B, and pole, A, in the manner herein set forth.

77,383.—BREAD CUTTER.—George L. Jones, Chicopee, Mass

I claim, 1st, The combination of the knife, B, having its end free, with the

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eccentric guide, C, and projecting plate, D, substantially as and for the purpose described.

2d, In combination with the device above claimed, the reversible gage, consisting of the piece, G, and pins, i, arranged as described.

77,384.—FLOOD GATE.—H. A. Kephart, Fletcher, Ohio.

I claim the tinged posts, A A, in combination with the sliding gate, B c, and the valve, C, in the manner and for the purpose set forth.

77,385.—IMPLEMENT FOR EXTRACTING HEDGE PLANTS AND WEEDS.—James L. Knick, Lexington, Ill.

I claim, 1st, An instrument which is adapted for the extraction of plants and weeds, consisting of handle portions, a a, and jaws, b b, united together by a spring strap, g, and provided with a slotted strap, d, and spring, e, substantially as described.

2d, In such an instrument, the elastic lining, g' g', applied to the jaws, b b, substantially as described.

77,386.—CLOTHES WRINGER.—A. F. Lapham, New York, and Frank E. Pratt, Mott Haven, N. Y., assignors to Malcom C. Turner.

We claim a clothes wringer, composed of the compressing bars, A B, link, C, with its thumb nut, a, springs, E E, and rollers, D D, all constructed, arranged, and operating in the manner and for the purposes herein specified.

77,387.—VALVE FOR GAS ENGINE.—William H. Laubach, Philadelphia, Pa.

I claim the devices herein described, consisting of the sliding sleeve, m, provided with the cams, k, constructed as described, the lever, n, shaft, l, valve, c', and stem, d''', with its tooth, k', for regulating the flow of a combined current of gas and air, alternately with air alone, into the cylinder of a gas engine, in such a manner that the former current shall continue to flow until the closing of the induction port and the moment of the ignition of said gas, substantially as described.

77,388.—MANUFACTURE OF GLUE.—John A. Lighthall and Reuben Lighthall, Brooklyn, N. Y.

We claim, 1st, The combination of the series of plates with the belt and driving pulleys, as and for the purpose set forth.

2d, In combination with the series of plates, attached to the belt, as before named, the arrangement for blowing a blast of cold air on the said plates after they have been dipped into the reservoir, for purpose of preventing the drip from the same, so that the glue attached to the plates shall be preserved of an equal and uniform thickness.

3d, In combination with the series of plates, attached to the belt, as before named, the arrangement for blowing a blast of hot air on the said plates on the descending side of the apparatus, for the double purpose of removing from the glue attached to said plates any moisture that may remain in it, and for removing the finished glue from the plates, as set forth.

77,389.—VENTILATING SHOW CASE.—William Henry Lockwood, Brooklyn, N. Y.

I claim, 1st, The combination, in a show case, of the ventilating sides or walls, A A, with the vertical partitions, C C, parallel to a transparent front, E, substantially as and for the purpose specified.

2d, A false bottom, B, and a sliding pan, F, in combination with a show case with ventilating sides or walls, A A, and vertical partitions, C C, substantially as herein described and specified.

77,390.—VISE.—Austin D. Mason (assignor to himself and Richard B. Robbins), Adrian, Mich.

I claim, 1st, The adjustable ring, C, constructed with oblique faces, x y, and a handle, h, for turning it on its axis, to adapt it to impart any desired to set to the face plate, D', in the manner and for the purposes set forth,

2d, In combination with the adjustable ring, C, the washer plate, B, and the face plate, D', with its spherical bilge, D, all constructed in the manner set forth and described.

77,391.—MOP WRINGER.—John M. May, Janesville, and Winslow M. Colton, Stoughton, Wis.

We claim the combination of the base, B, and lever, E, with rollers, C D, and thumb screws, F, substantially as and for the purpose specified.

77,392.—SIGNAL BOX.—William McKee, Neponset, Ill.

I claim, 1st, The combination of a box, M, tube, C D, provided with ways, H, blocks, E F, with lips, e f, cords and pulleys, I I, arranged and operating as and for the purposes set forth

2d, The combination of the box, M, tube, C, block, E, cord and pulley, I, and the ventilator or draught inducer for the lantern, arranged as described, and for the purposes specified.

3d, Providing the tube, C, with a glass, or its equivalent, O, when used in combination with the block, E, and lantern, in the manner and for the purposes set forth and shown.

4th, The combination of the box, M, tubes, C D, guides, H, blocks, E F, with their lips, e f, cords and pulleys, I I, ventilator, L, and glass, O, all arranged and operating in the manner and for the purposes specified and set forth.

77,393.—SHIELD FOR NIPPLE.—Thomas McLaughlin, Millville, N. J.

I claim the shield or covering, A, with the small holes, B, in combination with the cap, C, constructed and arranged as and for the purpose set forth.

77,394.—CORN HARVESTER.—George Meader, Prairie Center, Ill. Antedated April 19, 1868.

I claim, 1st, The combination of gatherers, J, cutters, n, and pickers, I, arranged and operating substantially as and for the purposes set forth.

2d, The combination of said gathering arms, J, with a rock shaft, L, or its equivalent, for rendering said gathers adjustable, substantially as described and set forth, and for the purpose of adapting the machine to corn of different hights.

3d, Providing said gatherers with the partitions, m, substantially as and for the purposes set forth.

4th, Providing said gathering fingers, J, with the depressions, c, in the manner specified.

5th, The arrangement of the cutters, n, immediately behind the shoulders, c, as and for the purposes set forth.

6th, In combination with said gatherers, J, and pickers, I, the adjustable husking plates or wheels, M, arranged and operating substantially in the manner and for the purposes set forth.

77,395.—FORWARD GEAR FOR CARRIAGES.—John J. D. Meincke, Milwaukee, Wis.

I claim draught irons, C C, and bottom and top pieces, D and E, in combination with king bolt, F, substantially as described.

77,396.—APPARATUS FOR TEMPERING SAW PLATES AND SIMILAR ARTICLES OF STEEL.—Geo. Mercer and John Hinton, St. Louis, Mo.

We claim, 1st, The carriage, B B1, when constructed of perforated plates, and the trussing ribs, b2 b3, substantially as shown and described.

2d, The combination and arrangement of the cap, B1, rope or chain, D, clevis, d, and pin, d1, and crab, d2, all arranged and operated as described and set forth, for the purpose of clamping and straightening the plates, E.

3d, The cap, B1, when combined eccentrically with the carriage, B, by means of the eccentric shaft B2, and operated by the chain or rope, F, roller, F', and crank, f, for the purpose of exposing the whole surface of the plate to the action of the tempering fluid.

4th, The springs, H, when arranged in combination with the bath tub, A, as herein described and set forth.

5th, The set screw, G, when employed in connection with the tub, A, and carriage, B B1, as described and set forth.

77,397.—WINDOW HOLDER FOR CARRIAGES.—J. H. Moore and William Johnson (assignors to Henry Hale & Co.), New Haven, Conn.

We claim the arrangement of the two parts, D and D, hinged to and combined with the holder, A, the whole constructed in the manner substantially as herein described.

77,398.—CAR COUPLING.—Thomas M. Moore, Newton, N. J.

I claim the arrangement of the notched plate, d, on the rear of the head, m, in combination with the sliding box, j, with its projections, c c, and interior pivoted plate, f, and spring, k, all constructed and operating substantially as specified.

77,399.—PACKING FOR CARRIAGE SHACKLE.—F. B. Morse, New Haven, Conn.

I claim the packing herein described, as an article of manufacture, and consisting of block, E, with the projections, F, and hp, f, as set forth.

77,400.—FRUIT GATHERER.—H. Walker Neal, Sidney, Ohio.

I claim, 1st, The slide, D, attached to the basket of the fruit gatherer, and working up and down upon the guide, E.

2d, The combination of the cord, h, and multiplying pully, G, for the purpose of rapidly elevating the basket.

3d, The combination of the cords, f and h, basket, C, and hook, B, arranged and operating as described, for the purpose set forth.

77,401.—QUARTZ STAMP MILL.—P. M. Papin, St. Louis, Mo.

I claim, 1st, The stamp, B, its serrated shoe, B2, and the spring pawl, d, when arranged and operating as described and set forth.

2d, The stamping boxes, E E', when constructed with the floor of one higher than that of the other, and arranged as herein described and shown.

3d, The friction brake, H, when applied to the rod, B or B1, as and for the purpose set forth.

77,402.—APPARATUS FOR DISCHARGING BILGE WATER.—Phineas Pardee, New Haven, Conn.

I claim the combination of the flexible tube, B, and its open mouth, C, together constituting a portable apparatus, and constructed and arranged so that the said tube will lead from the hold of the vessel out through any convenient opening, or over any convenient point above the water line to the said open mouth, so as to suspend the said mouth from the vessel, and so that the vessel passing through the water, or the water passing through the vessel, will create a draught through the said mouth and tube, and by such draught cause the water in the hold to pass through the said tube and out at the said mouth, all as herein set forth and described.

77,403.—REGISTER.—H. H. Phinney, Cambridgeport, Mass.

I claim the sectional frame, b, made in parts connected together and to the register plate, a, substantially as described.

Also, in combination with the slide, r, the spring, w, inserted beneath and bearing against the plate, a, and against an extension, v, from the slide, substantially as set forth.

77,404.—READY SOLDER.—D. H. Priest, Watertown, Mass.

I claim the above described composition for soldering metals, prepared and compounded substantially as described, and in about the proportions specified.

Putting up the above claimed composition in bottles having solder wire wound around them, convenient for use and transportation, substantially as described.

77,405.—CANAL LOCK GATE STEP.—Homer Rexford, Sandy Hill, N. Y.

I claim the construction and arrangement of the step, B, with its pivot, A, and feather, F, when combined with the metallic box, C, constructed with its annular slot, D, in the manner and for the purposes herein described.

77,406.—LIFTING JACK.—Ezra S. Robertson and Austin B. Collins, Mount Liberty, Ohio.

We claim the combination and arrangement of the lifting bolt, B, having a groove, d, and pulley, c, with the standard, A, lever, F, curved wedge, C, and thumb screw, E, the whole when constructed and operating in the manner and for the purpose as herein shown and described.

77,407.—MOWING MACHINE.—H. J. Ruggles, Poultney, Vt.

I claim the combination and arrangement of the swinging frame, E, adjusting rings, t t, or their equivalents, on the sides of the frame, the draught chains, s s, and the sliding draft hook, L, substantially as and for the purposes herein specified,

Also, the suspending hook, T, arranged and operating substantially as herein specified.

77,408.—REFLECTOR.—William G. Schmidlin and Jeremiah W. Driscoll, New York, N. Y.

We claim the concave dome reflectors, introduced in the sections or sides of the conical polygonal reflector, as and for the purposes set forth.

77,409.—WROUGHT IRON ROOF TRUSS.—George H. Sellers, Phœnixville, Pa.

I claim, 1st, A bulb beam, A, or rafter, having a bulb, b, below, instead of a flange, for the purpose of uniting the struts and tie rods thereto, without deflecting them from a straight line, substantially as described.

2d, Securing the purlines to the ratter, by means of notches in each at the points where they meet, and thus make a firm and simple union between them without the use of bolts, or rivets, or other fastenings, and allowing room for expansion or contraction without separating, substantially as described.

3d, A skew back, made of angle brackets, d, bolted or riveted on each side of the web of the beam, as and for the purpose herein described and represented.

77,410.—CORN SHELLER.—John H. Sharp, Wortsville, N. J.

I claim the employment of a series of yielding bars, C C, suspended over the inclined roller, B, by means of springs, d d, and rod, e, when all are arranged as and for the purpose described.

77,411.—LOCK NUT FOR AXLE AND SKEIN BOXES.—Joseph R. Smith, Bethel, Conn., assignor to himself and W. S. Shaw, Buffalo, N. Y.

I claim, 1st, The internal lip on the nut and the external lip on the axle or skein box to secure the nut on the axle or box, as set forth.

2d, The combination of the key, F, with the spring catch and the intervening lips of the nut and axle.

77,412.—HAND TRUCK AND SACK HOLDER.—Gideon Smoker and Jonas Smoker, Smithville, Ohio.

We claim the combination of the hand truck, A, with sliding platform, D, arranged to slide in grooves in the sides of the truck frame, said platform being provided with springs, C C, and rods, F F, upon which are spiral springs, e e, all arranged as and for the purpose set forth.

77,413.—WASHING MACHINE.—Otis W. Stanford and Selden S. Scoville, Lebanon, Ohio.

We claim, 1st, A washing machine, consisting of the yielding bed or frame, g I, rollers, G, battens, J J', stems, j j', rock shaft, K k k', and link, L, the whole being combined and operating substantially as herein described and set forth,

2d, The devices, J J' j j' K k k' and L, when attached to the sliding lid, N, and adapted to be operated in either of the chambers, C D or E, as explained.

3d, The devices, P Q V v, for enabling the shifting of the lid, N, and for securing it at any desired position, for the purpose described,

4th, In combination with the sliding lid, N, and its described accessories, J J' j j' K k k' and L, the chambers, C D E and F, for the object explained.

5th, In a washing machine constructed substantially as above set forth, the shiftable wringer rest, T U u, as described and set forth.

77,414.—STEAM GENERATOR.—J. Sutliff, East Boston, Mass.

I claim the hollow steam bridge wall, C, the sides braced by the hollow bolts, g g, and connected to the boiler pipes, f and d, constructed and arranged substantially as and for the purpose set forth.

77,415.—TABLE FAN AND CASTER STAND.—Noah H. Tilman and David G. Good, Arcanum, Ohio.

We claim the arrangement of the frame, E, outside of the box, D, and the stationary caster stand, B, said frame being perforated as described, whereby the fans, F F, may be adjusted to operate as herein specified.

77,416.—COMB CLEANER.—Edwin J. Toof, Fort Madison, Iowa. Antedated April 17, 1868.

I claim the arrangement of converging elastic strips, a, with a head, A, whether said head be provided with a brush, B, or not, as and for the purposes specified.

77,417.—WASHING MACHINE.—N. Trowbridge, Tully, N. Y.

I claim, 1st, The combination of the barrel, A, and reciprocating pounder, B, constructed with wedge formed projections, B1, and an inclined projection, B2, substantially as and for the purpose set forth.

2d, The combination of the barrel, A, the pounder, B, the shank, C, rod, D, and crank, E, spring lug, E2, pinion, F, spur wheel, G, and lever, H, all arranged to operate substantially as set forth.

77,418.—ROOFING CEMENT.—Newton Trowbridge and Edward Richardson, Tully, N. Y.

We claim the composition, compounded from the ingredients, and in the manner substantially as and for the purpose set forth.

77,419.—GRAIN SEPARATOR.—J. S. Upton, Battle Creek, Mich.

I claim, 1st, The screens, D D' D'', combined with the cylinder, B, and operating in the manner set forth, for separating the grain from the straw, substantially as specified.

2d, The vibrating spout, C, in combination with a threshing cylinder, and the series of screens, D D' D'', when used substantially as and for the purpose set forth.

77,420.—ARTIFICIAL SLATE SURFACE.—Oscar A. Wagner, Davenport, Iowa.

I claim a composition of matter for forming an imitation of the surface of slate, compounded from the ingredients named, substantially in the manner set forth.

77,421.—BOOT AND SHOE STUD.—H. S. Walcott, Boston, Mass., assignor to Boston Shoe Stud and Button Company.

I claim a shoe stud formed of a solid piece of metal and having a head and a shoulder or flange, with a groove between them of sufficient size to permit the lacing to move freely therein, and having a tubular stem, by which it can be secured to the shoe, as herein shown and described.

77,422.—PEN HOLDER.—Albin Warth, Stapleton, N. Y. Antedated April 19, 1868.

I claim a pen or brush holder the finger part of which is made triangular to fit the space between the fingers grasping the same, and which is provided with a triangular end that is twisted in regard to the finger part, and made to fit the V-shaped or triangular socket of a pen or brush, substantially as and for the purpose described.

77,423.—TRUNK.—Rebecca Weaver, Washington, D. C.

I claim, 1st, A rolling trunk constructed as herein described, as and for the purposes specified.

2d, The construction of the tills, B B, having rims, d d, with hinged or other props, f f, so that they may be set up or collapsed at pleasure.

3d, The jack-up cleats, C, in combination with the tills, B, and the cylindrical or rolling trunk, A, substantially as and for the purposes herein set forth.

4th, The manner of constructing the cover or lid, D, and cap, F, for protecting the lock and securing the trunk water tight, substantially as herein set forth.

5th, The manner of constructing the cover or lid, K K, with the hinged bolts and overlapping cap, substantially as and for the purposes herein set forth.

6th, Placing drawers, H, within the cylinder, A, to be drawn out at the end, thus giving double security to the contents when closed, as herein described,

77,424.—TAG FASTENING.—Wm. N. Weeden, Boston, Mass.

I claim the improved anchor as made with the hook, e, the encompassing flanges, d d, and the angularly formed barb, f.

77,425.—LAST HOLDER OR JACK.—George M. Wells (assignor to Moses D. Wells), Chicago, Ill.

I claim the rotary block or ball, A, as constructed, with a shank recess socket, and combined with a carrier, B, formed to receive such ball, as set forth.

Also the carrier, B, as cast with an opening through its bottom, and in one piece, on the rotary block or ball, provided with a shank socket, as set forth.

Also the carrier, B, as cast in one piece, upon the rotary block or ball, and with an opening through its bottom, and a fastening flange projecting from its sides, all as specified.

77,426.—CLEVIS.—Ralph C. Whitehouse, Boothbay, Me.

I claim the combination of the clevis box, a, having its pivoted clevis, b, hold back, e, either with or without the helix, f, and to be attached as and for the purposes set forth.

77,427.—INSTRUMENT FOR DRAWING NAILS.—Edward P. Whitney, Stamford, Conn.

I claim, 1st, The combination of the claw head, A, and shoe, B, constructed and operated substantially as and for the purpose herein specified.

2d, A spring, C, in combination with the claw head, A, and shoe, B, substantially as and for the purpose specified.

77,428.—BELLOWS FOR REED MUSICAL INSTRUMENTS.—A. W. Wilcox, New Haven, Conn.

I claim, 1st, The arrangement of the valve chamber, within the reservoir, B, by the construction of the wall, E, therein, with the openings, e, and valves, d, thereon, substantially in the manner and for the purpose specified.

2d, The construction of a recess in the floor, G, of the exhaust, beneath the openings, f, substantially in the manner and for the purpose described.

77,429.—MUCILAGE BRUSH.—G. D. Wilcox, Providence, R. I.

I claim the improved instrument for spreading mucilage or adhesive compositions, substantially as herein described.

77,430.—MACHINE FOR ATTACHING LABELS TO NEWSPAPERS, ETC.—John F. Zacharias, Leesburg, Va. Antedated April 11, 1868.

I claim, 1st, The combination of the sliding gate, L, and the scissors, M M, of an automatic labeling machine, with the eccentric, J, the transmitting devices, P and T, giving proper periods of rest to the carrying bands, C' C', all arranged and combined substantially as set forth.

2d, The slotted connecting rod, P, having a compound reciprocating and oscillating motion upon the fulcrum pin, P'', for the purpose of transmitting a rotary motion from one crank to another, in combination with the other devices of the machine, substantially as set forth.

3d, The combination with the said devices, or their equivalents, for transmitting rotary motion, of the auxiliary slot, V, in the connecting rod, T, for permitting a rest for the carrying bands, C' C', at every revolution of the roller, B, as and for the purpose set forth.

77,431.—CHURN.—Charles H. Elliott, York, Pa.

I claim, 1st, Communicating a vertical reciprocating motion to the dash rod, N, at the same time giving to this rod right and left rotary motions, by means of a vertically moving sash, C, a spirally grooved portion, f, and fixed but adjustable teeth, e e, arranged and applied within a frame, and driven from a shaft, E, substantially as described.

2d, The movable head piece, D', arranged over the churn vessel, and provided with adjustable toothed plates, J J, in combination with sash, C, and a spirally grooved portion, f, on the dash rod, substantially as described.

3d, The churn vessel, K', seated into a fixed base ring, L, in combination with the movable head piece, D', and the means substantially as described for operating the dash rod.

4th, The perforated dasher, P, and dash rod, N, provided with perforated or imperforated radial wings, g or h, constructed and applied substantially as described.

5th, The rotary wings, j, applied to rods, i, projecting radially from the dash rod, substantially as described.

77,432.—CONSTRUCTION OF SAFES.—Obadiah Marland, Boston, Mass.

I claim a safe or bank vault, the boundaries of which are made up of or are protected by entire compound plates, each of which is constituted of plates of iron and steel welded together, the steel layer or layers of each laminated plate being hardened, substantially as shown and described,

Also, the formation of the joints at the corners of the safe and at the edges of the door, so that the bottom of each section or joint is covered by steel, substantially as shown and described.

Also, the bolts, k, made of alternate tubes of iron and steel, drawn and welded together, substantially as set forth.

Also, inserting the bolts, m, into holes prepared, substantially as described, for their reception, and then changing the form of the bolts by pressure or percussion, so that thereby and with the conjointed action of a spreader, p, the bolts, m, will hold in their sockets, substantially as described.

REISSUES.

2,922.—PATTERN FOR CUTTING BOOTS.—Elias Shopbell, Ashland, Ohio. Dated Jan. 27, 1863.

I claim, 1st, The plate, A, in combination with the pairs of plates, B B', C C and D D', or their equivalents, with their respective slots and angles, producing the simultaneous movement of the several pairs of plates, and the consequent unequal enlargement and contraction of the pattern for boot fronts, substantially as herein set forth.

2d, Stationary and adjustable plates, so constructed and arranged in relation to each other and the slots as to produce a simultaneous contraction and expansion of said plates, according to any required size of boot fronts and backs, substantially as set forth.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

63,378.—BROADCAST SOWERS.—F. G. and E. A. Floyd, Macomb, Ill. Dated April 2, 1867. Application for reissue received and filed April 11, 1868.

I claim, 1st, The frame, A, constructed as described, shaft, B, dise, C, when arranged in relation to each other as and for the purpose set forth.

2d, The disk, C, with projection, c, in combination with shaft, B, the former being attached to the latter in the manner described.

3d, The shaft, B, with gear wheel, b, shaft, D, with gear wheel, d, and standard, E, the whole being combined and operated as set forth.

4th, The slide, F, constructed as described, in combination with pin, f, and holes, f', as and for the purpose set forth.

5th, The revolving disk, C, provided with radial flanges, C', having their outer ends projecting beyond, the periphery of the disk and curved in the manner shown, substantially as set forth.

6th, The combination of the frame, A, hopper, G, slide, F, and revolving disk, C, constructed as above set forth, all arranged for joint operation as herein described.

7th, The frame, A, shaft, B, with wheel, b, shaft, D, with wheel, d, disk, C, slide, F, hopper, G, and bag, H, the whole being combined and operated in the manner set forth.

49,203.—MACHINE FOR REFITTING STOP VALVES.—Charles S. and Charles F. Hall, Brooklyn, N. Y. Dated Aug. 1, 1865. Application for reissue received and filed April 11, 1868.

We claim, 1st, The concave mill, B, either provided with or not, an internal yielding center, c, and arranged in suitable bearings, a, in combination with the adjustable center, C, constructed and operating substantially as and for the purpose set forth.

2d, The guide, E, and conical mill, D, applied in combination with each other substantially as and for the purpose described.

3d, A portable apparatus for refitting the valves and valve seats of stop valves and water cocks, substantially as and for the purpose described.

74,582.—DEVICE TO PREVENT HOGS FROM ROOTING.—Geo. O. and Wm. L. Nixon, Sandyville, Ohio. Dated Feb. 18, 1868. Application for reissue received and filed April 11, 1868.

We claim the within described device consisting of the plate, A, arms, C C, with holes, D D, and wire, B, the several parts being arranged and used substantially in the manner and for the purpose herein specified.

64,231.—SKIRT HOOPS.—E. Wooster & Co. and F. Hull & Co. (assignees of John R. Lattin), Birmingham, Conn. Dated April 30, 1867. Application for reissue received and filed April 13, 1868.

We claim as the invention of John R. Lattin, the bottom hoop for hoop skirts formed by combining one or more springs in a single cover, the upper edge of which is formed as described, so as to be secured to the tapes of a skirt as and for the purpose set forth.

68,239.—STEAM DRYING APPARATUS.—William Ryner, Philadelphia, Pa., and John C. Hopewell, Flemington, N. J., assignees of Wm. Ryner, Philadelphia, Pa. Dated Aug. 27, 1867. Application for reissue received and filed April 14, 1838.

We claim as the invention of Wm. Ryner, a drying kiln in which are an upper and lower series of pipes for the passage of superheated steam to that for the introduction of the same into the kiln, so that the material to be dried (situated between the two sets of pipes) may be subjected to the combined action of the heat from the said pipes and that of the superheated steam, as set forth.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office, and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application.* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

EXTENSION NOTICES.

Polly Hunt, of Jersey City, N. J., administratrix, and George W. Hunt, of Newburgh, N. Y., administrator of the estate of Walter Hunt, deceased, having petitioned for the extension of a patent granted to the said Walter Hunt the 25th day of July, 1854, and reissued in four divisions of the dates and numbers respectively as follows: Nov. 29, 1864, numbered 1,828; Feb. 7, 1865, numbered 1,867; April 4, 1865, numbered 1,926; April 4, 1865, numbered 1,927; said last number (1,927) being again reissued in two divisions the 10th day of July, 1866, and numbered respectively 2,306 and 2,307, for an improvement in shirt collars, for seven years from the expiration of said patent, which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

Horace Woodman, of Biddeford, Me., having petitioned for the extension of a patent granted to him the 1st day of August, 1854, and reissued the 8th day of December, 1857, for an improvement in cleaning top cards of carding machines, for seven years from the expiration of said patent, which takes place on the 1st day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 13th day of July next.

Hymen L. Lipman, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 25th day of July, 1854, for an improvement in eyelet machines, for seven years from the expiration of said patent, which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

Charles A. Wakefield, of Pittsfield, Mass., having petitioned for the extension of a patent granted to him the 25th day of July, 1854, for an improvement in seed planters, for seven years from the expiration of said patent which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday the 6th day of July next.

Griffith Lichtenthaler, of Limestoneville, Pa., having petitioned for the extension of a patent granted to him the 25th day of July, 1854, for an improvement in cultivators, for seven years from the expiration of said patent, which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

Edward W. Brown, formerly of Fall River, Mass., having petitioned for the extension of a patent granted to him the 25th day of July, 1854, and reissued the 14th day of March, 1865, for an improvement in looms, for seven years from the expiration of said patent, which takes place on the 25th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 6th day of July next.

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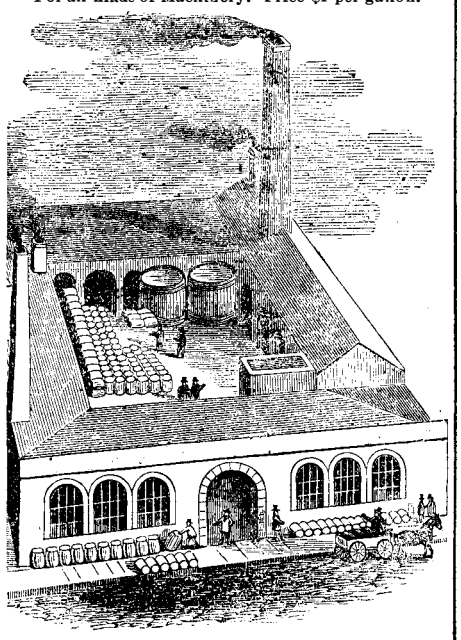

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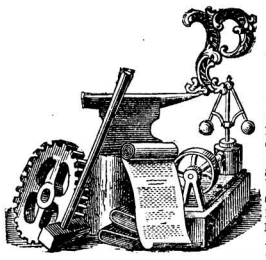

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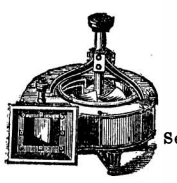

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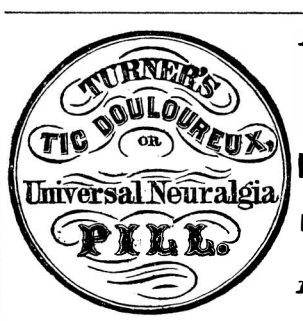

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